

THE IRON AGE

THURSDAY, APRIL 18, 1889.

Submarine Railroad Tunnel.

A grand railroad tunnel beneath the bed of the river St. Clair, at Port Huron, Mich., to cost probably \$5,000,000, is among the most important of modern engineering projects. The engineers Sooy-smith & Co., of New York, contracted with the Grand Trunk Railway Company for the work and preliminary surveys were made some months ago. The company now take charge of the project. The work of excavation on the American side will begin about 2500 feet back from the river, from which point there will be a steady decline to a depth of about 50 feet. The drift from the tunnel proper will be 22 feet in diameter, and the distance from one river bank to the other is 2200 feet.

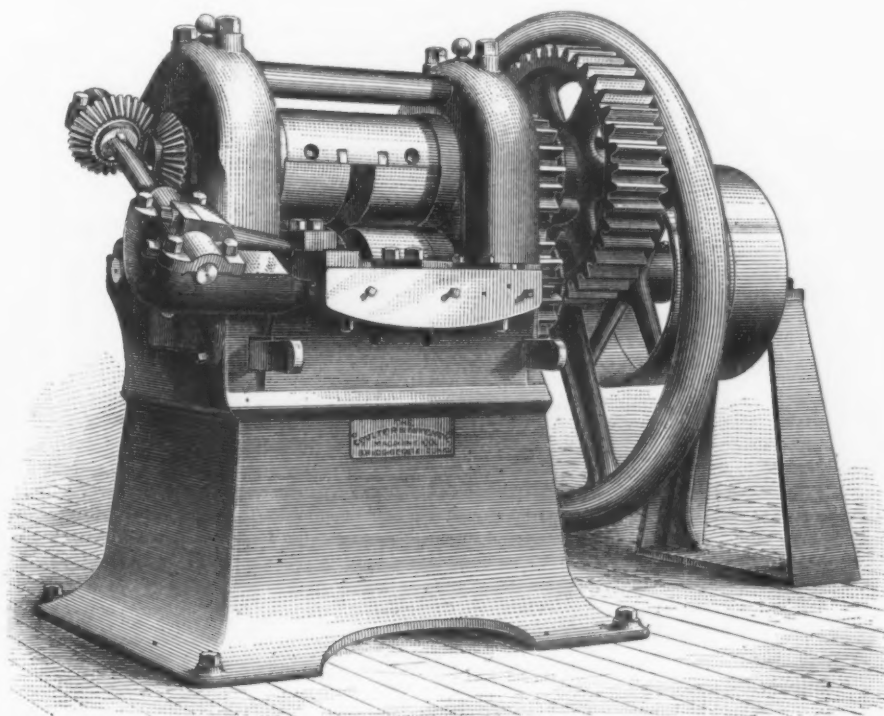
Treasury Department decides that the steel plates for the tunnel must pay the regular duty.

Rolling Mill.

The accompanying illustration represents a 4-ton rolling mill recently built for the Chicago Tire and Spring Company by the Coulter & McKenzie Machine Company, of Bridgeport, Conn. It is designed particularly for tapering the 5 x $\frac{1}{2}$ -inch steel plates used for locomotive truck springs. All the parts liable to wear or break are made of steel.

On the front of the machine is a sliding table, arranged for squeezing and straightening the blank. The faces of the rolls are so formed and so placed in relation

on three or four cents a day and get decent clothing for \$5 a year. The Admiral says there is no reason except the timidity of American capitalists to prevent our having a large share of the trade of this great and growing country, soon to make itself felt among the family of nations. He cannot see why they should not have American machinery or why there should be a fleet of 50 merchant steamships built by the English instead of by Americans. He can see no reason why our present commerce with Japan should be carried in English bottoms any more than the date crop of Persia should be brought to us by the English. As an illustration of the way the English ships do it, the Admiral says he came home in an English "ocean tramp" steamship, which started at Yokohama



ROLLING MILL, BUILT BY THE COULTER & MCKENZIE MACHINE COMPANY.

The tunnel will have a drop of 90 feet to the mile, the lowest end being on the Canadian side. The work of excavating in the tunnel will be done with large steel "shields," 22 feet in diameter, driven into the earth with 24 powerful hydraulic jacks. A large hydraulic engine will be used to work the jacks, and as fast as the earth is excavated it will be loaded on small trucks for removal. A gang of men will follow with the lining of the tunnel, which is cast iron. The tunnel will thus be completed as the work progresses. A blowing engine will force air into the tunnel through a 24-inch pipe. A force of 125 men will be employed on each side of the river night and day. The Collector at Port Huron reports that it will take about three months to put the plates together in the required form. The finished tunnel will comprise 2500 feet on the American side, 2200 under the river and 3000 on the Canadian side. It is estimated that the work will cost \$2,500,000, although well-informed men predict that it will cost nearer \$5,000,000. President Sir Henry Tyler and Manager Hickson have been heard to remark that it will be completed if it costs \$10,000,000. The United States

to each other as to give to the ends of the blank the taper found in spring plates. This action of the rolls spreads the ends and increases the width of the plate at those points. This excess is reduced by the sliding table, which moves transversely in front of the rolls, and is operated by a pitman connecting one end with a crank or eccentric on a shaft driven by the upper roll-shaft through beveled gearing. This machine may be used for forming file blanks, or similar work now usually done under the hammer. Tapering, squeezing and straightening are performed at one heat, and can be carried on as rapidly as the blanks can be heated and fed to the machine.

Progress in Japan.—Admiral Shufeldt, just returned from Japan, gives a glowing description of that country, with its postal service as good as our own, excellent telegraph system, free public schools everywhere, a national mint and banking system similar to the American, &c. The Admiral saw few beggars in Japan or large prisons and almshouses. Neither is there any great accumulations of wealth. The common people can live

and stopped at various ports in China and came through the Suez Canal, picking up cargo for New York all the way, and arriving here with about 5200 tons of freight, realizing \$60,000 for the ship at a cost of only about \$30,000. This ship was managed by a crew of about 43 men all told, with all modern appliances, and needed only four men on deck to keep her running. She came through the Suez Canal with nine other ships, eight of which were English.

An underground railroad project just brought out in Philadelphia causes much excitement. The scheme involves the expenditure of at least \$25,000,000. The corporation has been organized as the Broad and Market Streets Underground Railway Company. P. P. Bowles, manager of the Fairbanks Scale Company, is the president. Ex-Gas Trustee James E. Salter is the secretary and treasurer. The plans are for the construction of a four-track road. Two tracks are to be set aside for fast trains and the other two for trains that will stop at stations to be erected about half a mile apart.

The New Inman Steamer City of Paris.

According to reports of English newspapers, the new steamer City of Paris, which recently made her first trip across the Atlantic, bids fair to rival in speed the present ocean greyhounds. When steaming toward the Alfred Dock, Birkenhead, she performed the remarkable feat of turning almost around in her own length, thereby greatly increasing the interest of the spectators who were watching her. The new vessel is a *fac-simile* of the City of New York, but is expected, in regard to her steaming qualities, to far distance her prototype. According to the present plans, she will first be submitted to a thorough and practical test of one or more voyages to New York in order to insure easy working of her machinery. The reports state that on the trial trip, when the water was a trifle rough and the wind strong, the ship was driven at 15 knots, then at 18, then at 20, the engines all the time working with complete satisfaction. The final trip was an extended run, during which 21.59 knots an hour were registered. During the run from Greenock to Liverpool, with strong head winds and through a choppy sea, the ship made 20 knots an hour, this rate being continued the greater part of the night. Although the City of New York and City of Paris are sister ships, laid down at the same time and built from the same designs, the latter has occupied six months longer in construction. The building of the City of New York was pushed forward to meet the press of traffic; but the City of Paris has been carefully and elaborately finished, and her engines have received the most minute attention, and the result is that, although new, the machinery has worked without the slightest hitch. Two years were occupied in the building. Except that in the newer ship the Inman Company have discarded some of the patent apparatus which in the City of New York worked unsatisfactorily, the two vessels are in every detail identical. Like the City of New York, this latest addition to the Inman line is 565 feet long over all, 63½ feet broad, 42 feet deep, and 10,500 tons gross register. Her engines are capable of developing 20,000 horse-power. She has five decks, and the depth of the hold is 39½ feet. Accommodation is provided for 2000 passengers—700 first-class, 390 second-class, and the remaining 910 steerage. As regards her decorations and appointments, the vessel is literally a floating palace, replete not only with every comfort, but luxury. She has a promenade deck extending from stem to stern. Below, the saloon dining-room is capable of accommodating 300 passengers; it is the width of the ship, and has an arched roof 20 feet high, with alcoves along the sides. At the after end of this spacious saloon there is a large hall, in which is placed a grand staircase leading down to the luxurious drawing-room and library. The smoking-room, another elaborately fitted apartment, is on the upper deck. It is 45 feet long and 27 feet broad, and will hold 130 votaries of the weed. It is a feature of the City of Paris, as of her sister ship, that there are provided for saloon passengers a number of elegantly appointed private sitting-rooms, as well as private bathrooms. Altogether the state-rooms for first-class passengers number about 480. For the second-class passengers there have been provided a tastefully decorated and elegant dining hall, 40 feet wide, 27 feet high, and capable of holding 150 diners. There are also 96 second-class state-rooms. The ship is divided into water-tight compartments, without doors, and would be perfectly seaworthy with three of these divisions flooded. She has a double bottom, capable of holding 1500

tons of water ballast, and to prevent her rolling is fitted with a water chamber, extending the width of the ship and half filled with water, by which any tendency to oscillation is so successfully counteracted that on the passage from Glasgow the motion of the ship was scarcely perceptible. She is lighted by 1000 incandescent electric lamps, fed by a current from five powerful electrical machines stationed in the engine-room.

Natural Gas vs. Coke and Coal.

Prof. S. A. Ford, chemist of the Edgar Thomson Steel Works, at Braddock, Pa., recently contributed the following interesting article to the Greensburg (Pa.) Press, which we reproduce:

So much has been claimed for natural gas as regards the superiority of its heating properties as compared with coal that some analyses of this gas, together with calculations showing the comparison between its heating power and that of coal, may be of interest to your readers. These calculations are, of course, theoretical in both cases, and it must not be imagined that the total amount of heat in a ton of coal or in 1000 cubic feet of natural gas can ever be fully utilized. In making these calculations I employed as a basis what in my estimation was a gas of an average chemical composition, as I have found that gas from the same well varies continually in its composition. Thus, samples of gas from the same well, but taken on different days, vary in nitrogen from 23 per cent. to nil, carbonic acid from 2 per cent. to nil, oxygen from 4 per cent. to 0.4 per cent., and so with all the component gases. Before giving the theoretical heating power of 1000 cubic feet of this gas I will note a few analyses. The first four are of gas from the same well, samples taken on the same day that they were analyzed. The last is from another well in the East Liberty district.

I also give a few analyses of Siemens producer gas. The immense heating power of the natural gas over the Siemens may be seen at a glance when compared bulk for bulk:

Natural Gas.					
	1.	2.	3.	4.	5.
When Tested.....	Oct. 28, 1884.	Oct. 29, 1884.	Oct. 24, 1884.	Dec. 4, 1884.	Oct. 18, 1884.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Carbonic acid.....	0.8	0.6	nil.	0.4	nil.
Carbonic oxide.....	1.0	0.8	0.58	0.4	0.1
Oxygen.....	1.1	0.8	0.78	0.8	2.10
Olefiant gas.....	0.7	0.8	0.98	0.6	0.8
Ethylid hyd'e.....	3.6	5.5	7.92	12.3	5.2
Marsh gas.....	72.18	65.25	60.70	49.58	57.85
Hydrogen.....	30.62	36.16	29.06	35.92	9.64
Nitrogen.....	nil.	nil.	nil.	nil.	23.41
Heat units.....	728,746	698,853	627,170	745,813	592,380
Siemens Producer Gas.*					
Carbonic acid.....	3.9	8.7	9.3	1.5	6.1
Carbonic oxide.....	27.3	20.0	16.5	23.6	22.3
Hydrogen.....	.....	8.7	8.6	6.0	28.7
Marsh gas.....	1.4	1.2	2.7	3.0	1.0
Nitrogen.....	67.4	61.4	62.9	65.9	41.9
Heat units.....	93,906	97,184	99,074	114,939	16,416

* See Vol. XI, p. 300, Transactions of American Institute of Mining Engineers.

We will now see how the natural gas compares with coal, weight for weight, or, in other words, how many cubic feet of gas will contain as many heat units as a given weight of coal—say a ton. In order to accomplish this end we will be obliged, as I have before said, to assume as a basis for our calculations what I consider a gas of an average chemical composition, namely:

	Per cent.
Carbonic acid.....	0.6
" oxide.....	0.6
Oxygen.....	0.8
Olefiant gas.....	1.00

Ethylid hydride.....	5.00
Marsh gas.....	67.00
Hydrogen.....	22.00
Nitrogen.....	3.00

Now, by the specific gravity of these gases we find that 100 liters of this gas will weigh 64.8585 grams, thus:

Marsh gas.....	67.0 L.	weighs 48.0256 grms.
Olefiant gas.....	1.0	" 1.2534 "
Ethylid hydride.....	5.0	" 6.7200 "
Hydrogen.....	22.0	" 1.972 "
Nitrogen.....	3.0	" 3.7652 "
Carbonic acid.....	0.6	" 1.2257 "
" oxide.....	0.6	" 0.7526 "
Oxygen.....	0.8	" 1.1468 "

Total..... 64.8585

Then if we take the heat units of these gases we will find that:

	Grams	Heat
Marsh gas.....	48.0256	contain 627,358 units.
Olefiant gas.....	1.2534	" 14,910 "
Ethylid hydride.....	6.7200	" 77,679 "
Hydrogen.....	1.9712	" 67,939 "
Nitrogen.....	3.7630	"
Carbonic oxide.....	0.7526	" 1,808 "
" acid.....	1.2257	"
Oxygen.....	1.1468	"
Total.....	64.8585	" 789,694 "

64.8585 grams is almost exactly 1000 grains, and 1 cubic foot of this gas will weigh 267.9 grains; then the 1000 liters, or 64.8585 grams, or 1000 grains, is 3.761 cubic feet. 3.761 cubic feet of this gas contains 789,694 heat units and 1000 cubic feet will contain 210,069,604 heat units. Now, 1000 cubic feet of this gas will weigh 265,887 grains, or, in round numbers, 38 pounds avoirdupois. We find that 64.8585 grams, or 1000 grains, of carbon contains 52,404 heat units and 265,887 grains, or 38 pounds, of carbon contains 139,398,896 heat units. Then 57.25 pounds of carbon will contain the same number of heat units as the 1000 cubic feet of the natural gas—viz., 210,069,604. Now, if we say that coke contains in round numbers 90 per cent. carbon, then we will have 62.97 pounds of coke equal in heat units to 1000 cubic feet of natural gas. Then if a ton of coke, or 2000 pounds, costs \$2.50, 62.97 pounds will cost 7½ cents, or 1000 cubic feet of gas is worth 7½ cents for its heating power.

We will now compare the heating power of this gas with coal, taking as a basis a coal slightly above the general average of the Pittsburgh coal—viz.:

Carbon.....	82.75
Hydrogen.....	5.31
Nitrogen.....	1.04
Sulphur.....	0.95
Oxygen.....	4.64
Ash.....	5.31

We find that 38 pounds of this coal contains 146,903,820 heat units, then 54.4 pounds of this coal contains 210,069,604 heat units, or 54.4 pounds of this coal is equal in its heating power to 1000 cubic feet of the natural gas. If our coal costs us \$1.20 per ton of 2000 pounds, then 54.4 pounds costs 3½ cents, and 1000 cubic feet of gas is worth for its heat units 3½ cents. As the price of coal increases or decreases the value of the gas will naturally vary in like proportions. Thus, with the price of coal at \$2.50 per ton, this gas will be worth 6½ cents per 1000 cubic feet. If 54.4 pounds of coal is equal to 1000 cubic feet of gas, then 1 ton of coal is equal to 36,764 cubic feet. In these calculations of the heating power of gas and coal no account is, of course, taken of the loss of heat by radiation, &c. My object has been to compare these two fuels merely as regards their actual value in heat units.

In collecting samples of this gas I have noted some very interesting deposits from the wells. Thus, in one well the pipe was nearly filled up with a soft grayish-white material, which proved on testing to be chloride of calcium. In another well, soon after the gas vein had been struck, crystals of carbonate of ammonia were thrown out, and upon testing the gas I found a considerable amount of that alkali, and with this well no chloride of calcium was observed until about two months after the gas had been struck.

Hand or Power Molding Machine.

This machine may be operated either by hand or power, so that, if desired, the compression may be produced by power, or, in the absence of power, it may be produced by hand. The two platens are arranged one above the other, the lower moving up and down and the upper swinging backward and forward; when the latter is brought forward over the other the mold on the lower is forced up against the upper platen to compress the sand, and then as the lower platen drops the upper is thrown backward for the removal of the prepared mold and the preparation for another. The lower platen is supported upon two vertical slides working through guides in the bars of the frame. Placed in bearings in the lower part of the frame is a rock shaft having a backwardly projecting arm, upon which rests a strut bearing against the under side of the lower platen, so that when the shaft is turned it

an army of 15,000 men, supplemented by colossal steam diggers, scoop out day by day the pathway along which steamships will ere long glide to and from Cottonopolis and the sea.

The Past and Present of Pittsburgh Natural Gas.

A recent circular, relating to a proposed new mortgage loan of \$2,500,000 of the "Philadelphia Company," Geo. Westinghouse, president, and Chas. Paine, vice-president and general manager, who practically control the natural gas supply in and around Pittsburgh, gives a succinct statement of the past and present of this great product:

Organization.—The Philadelphia Company were reorganized May 24, 1884, under the provisions of a special charter, originally granted to the Empire Contract Com-

and an almost entire immunity from accident, that finally most of the competing companies sought and obtained the privilege of incorporation with the Philadelphia Company, or placed their lines in their hands for operation under lease. Thus the company practically control the gas supply of the cities of Pittsburgh and Allegheny and their suburban villages; also 13 surrounding towns and boroughs. Reference to the accompanying map (not engraved) will show the extent of the company's mains and their favorable location. Originating in the three greatest anticlinal reservoirs yet discovered—Murrysville, Grapeville and Canonsburg—they carry the product of 200 producing wells to Pittsburgh by 19 different routes, supplying on the way the towns and villages mentioned. By a comparatively small expenditure the adjacent fields of Bakertown and Belle Vernon, where the company have large tracts of promising gas territory in reserve, can be made tributary to the company's supply.

The Low-Pressure System.—The cities of Pittsburgh and Allegheny are supplied with gas at low pressure through a system of mains and service lines aggregating 258 miles in length, of which 206 miles, owned in fee by the company, cost considerably more than \$2,500,000. This portion of the company's work is practically completed, nearly every street of any consequence having already been piped. The principal mains are of unusual size, being from 20 to 36 inches in diameter. All city lines have been constructed in the most approved and substantial manner, with double joints, escape-pipe, and other patent appliances, which, with automatic regulators and cut-offs, reduce the chances of accident to a minimum.

The company's plant now is:

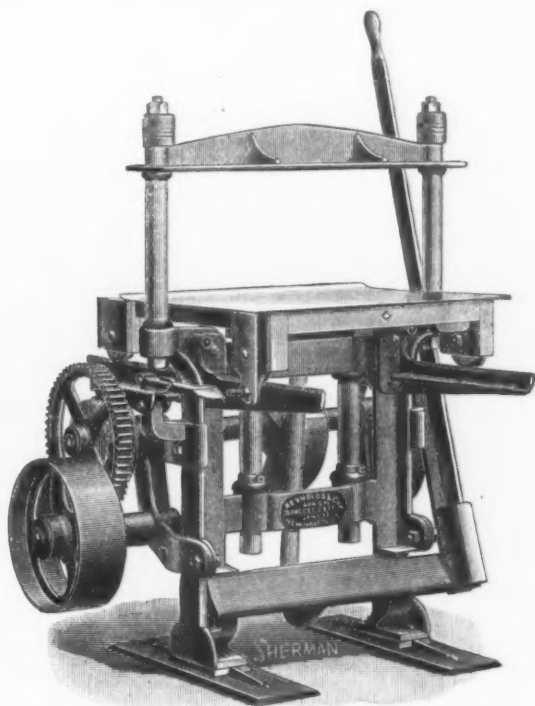
Pipe lines owned in fee.....	Miles.	524.18
Pipe lines operated under leases.....	185.29	709.47
Gas lands owned in fee.....	Acres.	381
Gas and oil rights in fee.....	2,194	
Gas and oil leases.....	14,551	17,126
Gas and oil rights and leases of leased companies.....	16,773	
Total gas territory controlled by Philadelphia Company.....	33,899	
Number of producing wells.....	200	
Telephone lines owned in fee.....	Miles.	121.75
Telephone lines leased.....	65.50	187.25

Consumers.—On January 1, 1889, the Philadelphia Company were supplying 750 manufacturing establishments, including 38 iron and steel works, &c., and 23,080 houses. The quantity of gas required for this service approximates 500,000,000 cubic feet per day, which is equal to about 25,000 tons or 2500 carloads of coal displaced.

Earnings and Expenses from October 1, 1885, to December 31, 1888.

	Earnings.	Expenses.
1885.....	\$553,495	\$189,297
1886.....	1,035,886	579,743
1887.....	1,756,769	735,055
1888.....	2,524,150	741,653
Total.....	\$6,450,309	\$2,245,748
All new wells.....		225,657
Field pipe lines, station buildings, right of way and telephone lines.....		207,000
Rents paid leased companies.....		411,572
Total operating expenses, &c.....		\$3,089,977
Net earnings.....		3,360,331
Less dividends paid.....		2,423,280
Surplus invested.....		\$937,051

Since January 1, 1888, gross operating expenses include the total cost of all new wells, field lines, telephone lines and other items that might be charged to capital. Based on existing contracts, the estimated gross annual revenue now exceeds \$3,100,000, an increase of nearly \$600,000 over the gross revenue of 1888. Since November 20, 1885, the company have paid 40 consecutive monthly dividends of 1 per cent. each on the capital stock.



HAND OR POWER MOLDING MACHINE, MADE BY REYNOLDS & CO.

will raise or lower the platen. The shaft is operated to produce the compressing movement by means of an elastic lever. The upper platen is carried by two rods hung on trunnions at their lower ends. In operation the flask and sand with the mold are placed upon the lower platen, when the upper platen is drawn forward and the lever moved to raise the lower platen and compress the sand in the mold.

Power is applied to the machine by a cam working against the back of the spring lever and mounted upon a shaft to which power is transmitted. The construction is such that the rock or cam shaft only rises to produce compression when the upper platen is in its forward position over the lower; a single revolution of the shaft then produces the compression, when power is automatically detached. When it is desirable to operate the machine by hand the power attachment can be easily disengaged.

This machine is made by Reynolds & Co., of New Haven, Conn., who also manufacture other forms of molding machines which have been long and favorably known.

The grand ship canal between Liverpool and Manchester is being made with wonderful rapidity. An English paper says

pany by an act approved March 20, 1871. The rights, powers, privileges and franchises conferred by and in said act of incorporation are exceptional in their nature and value, and are enjoyed by no other natural gas company.

Business.—Notwithstanding the liberal scope of its charter, the business of the company is at present confined to the mining, conveyance and sale of natural gas. Although the existence of this wonderful product has been known for centuries, and its utilization attempted in a small way ages ago, the year 1875 marked its first introduction in the manufacture of iron, and not until the product of the famous Murrysville Well was piped to Pittsburgh in 1883 did the people of Western Pennsylvania realize its value and recognize in it the fuel of the future.

The Past and Present.—Entering the field in 1884, the Philadelphia Company found it already occupied; but, equipped by the inventive genius of their promoter, Mr. Geo. Westinghouse, Jr., with many appliances for the safe conveyance of gas, and backed by a capital of \$5,000,000, subsequently increased to \$7,500,000, the Philadelphia Company soon distanced their competitors. So great was the advantages gained by an unfailing supply of gas, superior facilities for delivering the same,

Assets and Liabilities.	
Available assets—Cash, bills receivable, &c.....	\$884,897
Unavailable—Real estate and plant..	9,635,584
Total	\$10,520,481
Liabilities.	
Capital stock paid in.....	\$7,500,000
Accounts payable.....	111,736
Bills payable.....	1,971,063
Undivided profits.....	937,052
Total	\$10,520,481

The circular further points out that to duplicate the Philadelphia Company's system of mains and service lines—constructed under the most favorable circumstances and occupying the vantage ground at every point—and, at the same time, to acquire an amount of gas territory equal in value and extent to theirs, if not impossible would at least require double the capital they have invested. And as to the chance for increasing business, the circular states that adjacent to the company's mains in the cities and towns already piped there are more houses to use gas for fuel than the num-

ber of those already supplied. The reconstruction of mill furnaces on the regenerative principle now being made the condition of continued supply, the extensive introduction of gas-saving appliances and the sale of gas for domestic use by meter only is expected to do away with the waste that has heretofore existed, and so reduce the consumption of gas at least one-half. This saving, it is believed, will enable the company to furnish the houses still unsupplied and thereby greatly increase their revenue. By the employment of incandescent and other patent burners, the use of natural gas for illuminating promises a handsome income in the near future.

To take up the floating indebtedness of the company and provide for an extension of the main lines and distributing system as soon as desirable, the stockholders have authorized an issue of mortgage bonds to the amount of \$2,500,000, of which the company propose to place at present \$1,500,000. The mortgage provides for a payment annually of 10 per cent. of the amount of the bonds, less the accumulated interest on the sinking fund in the hands of the trustees, so that the bonds secured by the mortgage will be extinguished on November 30, 1898.

The increasing wealth of the United States is indicated by the importations of diamonds, an examination of the Custom-

Electrically-Operated Drawbridge.

The usual method of operating a drawbridge is by means of a pinion mounted on a vertical shaft in bearings on the bridge and engaging with a circular rack secured to the top of the pier, power being supplied by two or three men working a long lever fitting on the vertical shaft, or by a steam engine through suitable gearing. The electric motor has now been brought forward to do this work, and during the past few weeks one has been most successfully operating the Bridgeport, Conn., draw. This bridge, which is 180 feet long, 60 feet wide and weighs 320 tons, was formerly turned by three men,

connected in series. The double switch 16, fuses, reversing switch 15 and rheostat 14 are inclosed in a water-tight box, 13, in the frame-work of the bridge, and are easily accessible from the road-bed. The bridge-tender has everything under complete control and can easily regulate the speed and the direction of rotation of the bridge. The motive power is furnished by a 7½ horse-power Thomson-Houston motor, 1, securely fastened to the draw by iron braces. On the end of the armature shaft, which revolves at the rate of 1500 turns a minute, is a pinion 4½ inches in diameter engaging with a gear 15 inches in diameter. The shaft of this gear carries a beveled pinion 5 inches in diameter engaging with one 15 inches in diameter mounted on a vertical shaft. Power is then transmitted through a train the five pinions of which are 7 inches in diameter and the five gears 14 inches in diameter, the faces of all being 4 inches. On the bottom of the last or slowest revolving shaft 3 is an 11-inch pinion, 4, which engages with the

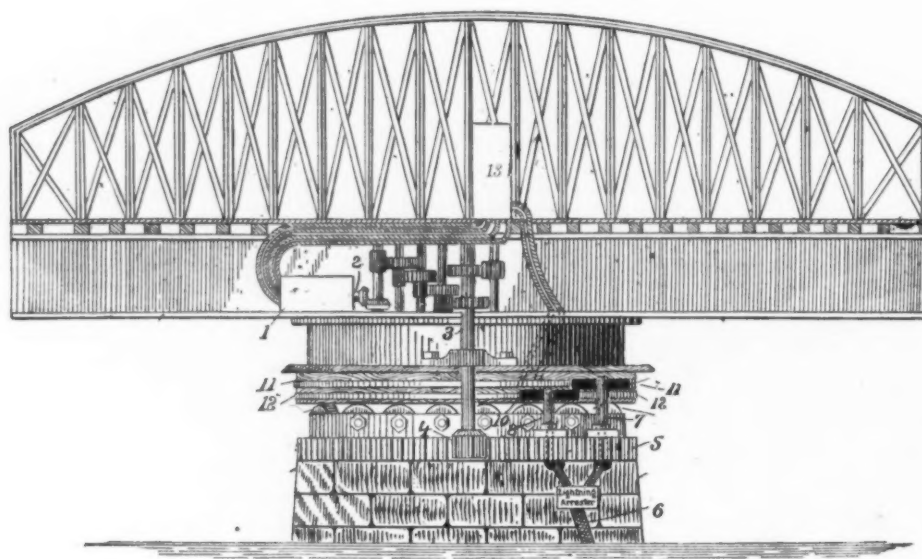


Fig. 1.

DRAWBRIDGE AT BRIDGEPORT, CONN., OPERATED BY ELECTRIC MOTOR.

but this method was found to be open to serious objection and attended by considerable expense, as it necessitated the constant attendance of the men, and under favorable circumstances the bridge could not be opened in less than six minutes, thus causing a jam on both sides and greatly impeding traffic. By means of the electric motor the draw can now be opened and closed in two minutes, and the expense is limited to the salary of one man and the charge of the electric light company supplying the current.

The current is conducted to the motor through two submarine cables, the core being equal to No. 4 B. & S. copper wire, which are protected from lightning by two Thomson-Houston lightning arresters. The shore ends are connected to the incandescent lighting current of the Bridgeport Electric Light Company by a double-pole switch, so that the current may be shut off at the pleasure of the draw-tender. The other ends are connected to vertical stationary posts 7, 8, which are carefully insulated from the structure, and which carry on their upper ends a pair of brushes, 9, 10, which are in contact with two insulated copper bands, 11, 12, attached to the drum of the bridge. A rheostat, 14, is used to regulate the speed of the motor and a reversing switch, 15, to change the direction of rotation of the armature. The armature, rheostat and fields are con-

connected in series. The double switch 16, fuses, reversing switch 15 and rheostat 14 are inclosed in a water-tight box, 13, in the frame-work of the bridge, and are easily accessible from the road-bed. The bridge-tender has everything under complete control and can easily regulate the speed and the direction of rotation of the bridge. The motive power is furnished by a 7½ horse-power Thomson-Houston motor, 1, securely fastened to the draw by iron braces. On the end of the armature shaft, which revolves at the rate of 1500 turns a minute, is a pinion 4½ inches in diameter engaging with a gear 15 inches in diameter. The shaft of this gear carries a beveled pinion 5 inches in diameter engaging with one 15 inches in diameter mounted on a vertical shaft. Power is then transmitted through a train the five pinions of which are 7 inches in diameter and the five gears 14 inches in diameter, the faces of all being 4 inches. On the bottom of the last or slowest revolving shaft 3 is an 11-inch pinion, 4, which engages with the

This installation was built by the New England Electric Supply Company, after designs by J. M. Orford, who has applied for patents upon the apparatus. The shafting and gearing were made at the Follansbee Machine Works, Bridgeport.

The Strong Locomotive's Time.—

The official report of the recent trial of the Strong locomotive on the Erie Railway gives the following report of time made: "On the eastward trip, the Buffalo Division was covered in 155 minutes, the Susquehanna in 208 minutes, the Delaware in 159 minutes and the Eastern in 141 minutes. The times made up were respectively 8, 18, 21 and 13 minutes, or 60 minutes in all. The fastest mile noted was made in 55 seconds, and many were made in 60 seconds each. On the Delaware Division the distance from Callicoon to Hancock, 28 miles, was covered in 34 minutes, and from Hancock to Deposit, 13 miles, in 20 minutes, the grade being up. On

the Susquehanna Division the distance from Binghamton to Union, $8\frac{5}{16}$ miles, was covered in 12 minutes; from Union to Owego, $13\frac{1}{16}$ miles, in 17 minutes; from Owego to Waverly, $19\frac{1}{16}$ miles, in 23 minutes; Waverly to Elmira, $17\frac{5}{16}$ miles, in 22 minutes, and from Elmira to Corning, $17\frac{3}{16}$ miles, in 25 minutes. On the Buffalo Division the distance from Hornellsville to Canaseraga, $12\frac{1}{4}$ miles, was made in $18\frac{1}{4}$ minutes; from Castile to Warsaw, 10 miles, in 15 minutes; Warsaw to Attica, $17\frac{3}{16}$ miles, in 22 minutes."

The Dominion Government is being urged to build a railway bridge across the St. Lawrence at Quebec, to cost \$6,000,-

barges of 1000 tons each, to be built in New Haven, and go on the line between the New Jersey coal docks and Providence, R. I.

Norton Brothers' Can Factory.

One of the most remarkable aggregations of automatic machinery is assembled under the roof of Norton Brothers' can factory at Maywood, near Chicago. In the character of the work performed and the results accomplished it is claimed to be superior to anything else in the line of automatic machinery. Norton Brothers are manufacturers of tin cans of every description. They have manufactories at

is the machine-shop, in which all the machines and tools used by the firm are built. It contains an excellent equipment of planers, lathes, drills, &c. A novel feature about it is the tool-room, which is kept on an original plan which is worthy of general adoption. This room is connected by an electric system, similar to that used in hotels, with every part of the machine-shop and other portions of the factory in which tools are likely to be called for by the workmen. A hotel annunciator hangs in a conspicuous part of the tool-room. When a workman wants a tool he pushes a button near him and immediately a "bell-boy" runs to him from the tool-room with a slate and pencil, on which he writes his name and the tool desired. The numbers on the annunciator correspond with the numbers of the buttons, to fix the location of the summons. The boy hands the slate to the tool-room keeper, who has a list of the workmen's names, numbered according to the order in which they are placed on the list, but without reference to the number on the annunciator, which is an independent matter. A rack hangs conveniently near with a sufficient number of pins on it to hold small brass checks numbered to correspond with the workmen's numbers. Each pin holds a stock of several checks of the same number. The toolroom-keeper takes one of the checks of the man who sent for a tool, puts it in the tool-rack from which he takes the article wanted, charges the workman with it in a book kept for the purpose, and sends the boy back with the tool. The time of the workmen is thus saved, there is no confusion in the shop from men loitering to talk with others on their way to and from the tool-room, and a perfect record of the tools is always kept. When the tool is to be returned the boy is again called, the workman is credited with it on the books, and the check is restored to its place on the rack. This is an instance of the methods employed throughout the whole factory, care being taken in every respect to have operations conducted systematically, economically and with the least friction.

Entering the can-making department, a long row of machines is seen, which stretch with their connections from one side of the large building almost to the other. In these machines the tin plate is fed, cut into pieces of the proper size for can-bodies. It is drawn into tubular form over a mandrel, double seamed, and passed on into a carrier. The subsequent operations of heading, soldering, testing for leaks, drying, counting, and delivering either into the warehouse or the car for shipment proceed steadily onward without the intervention of a hand to direct any of the movements of the machinery or to perform any part of the manufacture. The disks for the heads are cut on a number of presses, with the dies so arranged as to cut out the greatest possible number from a sheet of tin plate. The dies are arranged in gangs, and cut out alternate disks at one operation and the intermediate disks at another, as their frame-work would not permit them to be set close enough to cut all out at once. From the largest spaces of tin plate left between the holes thus made a set of gang-dies cuts out can tops, and from the remnant still existing another set of gang-dies cuts out small disks for button covers to be sold to button manufacturers. Use has thus been made of the tin plate as far as possible in these works and the residue is sold for scrap to sash-weight manufacturers.

The caps for cans are already prepared with solder for the soldering iron when they are shipped to the canning factories. This solder is cut out of sheet solder in the form of a ring of the proper size and it is forced on the rim of the cap. It was found necessary to devise a special machine to do this in order to use the solder-

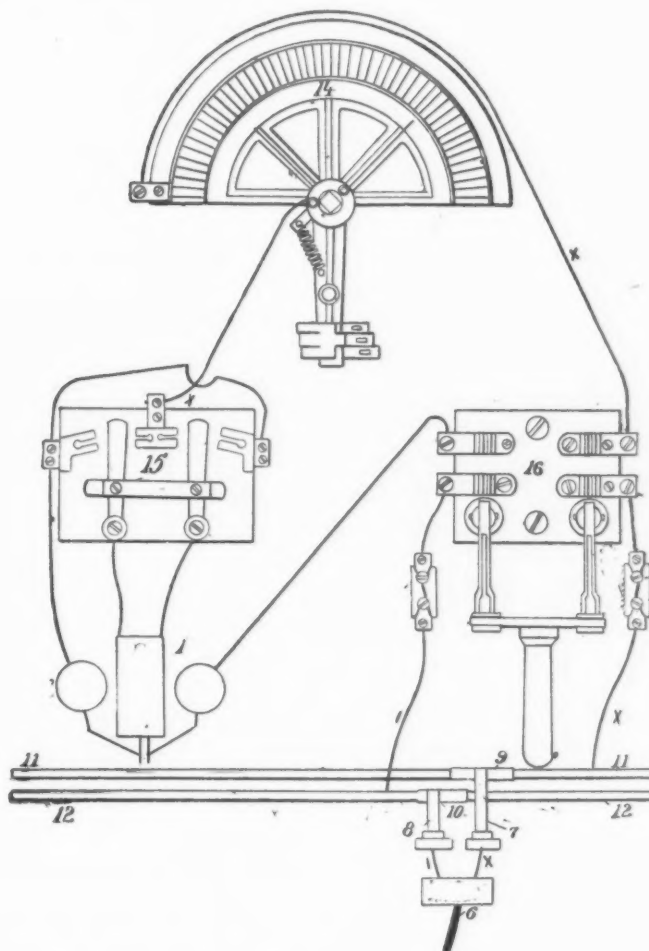


Fig. 2.

DIAGRAM SHOWING ELECTRICAL CONNECTIONS OF BRIDGEPORT DRAWBRIDGE.

000. Already there are two bridges, at Montreal and Lachine, which unite the Colonial system with the Western lines, and a bridge in progress at Coteau will give a third connection for an all-Canadian route between the Atlantic and Pacific.

The coal barge lines in the New York and Eastern trade are increasing their fleets by adding several vessels of the largest capacity adapted to the outside route. At Norwalk, Conn., six barges of about 1300 tons each are building for the New London Outside Towing Line, which is engaged principally in the bituminous trade with Virginia. The Boston Towboat Company is enlarging its scale of operations by building a large number of 2000-ton barges, regular sea-going vessels, provided with sufficient sails to be navigable even though the steam escort should be compelled to cut loose. The New England Transportation Company in like manner will during the season add four ocean

Chicago and at Maywood and are interested in similar establishments at San Francisco, New York and Hamilton, in Canada. Recently they purchased the property of the Abbott Iron Company at Baltimore, and propose to convert the buildings formerly used for rolling mills into a can factory to supply tin cans to the oyster and fruit canners of that part of the country. They own the special machines used in all these factories, which are the invention of Edwin Norton, whose genius in devising and perfecting automatic machinery places him in the foremost rank of those American inventors who have astonished the world with their achievements. The consumption of tin plate in these works is enormous, far exceeding that of any other works in any branch of manufacture in the world. A recent visit to their works at Maywood was full of interest.

Upon entering the factory, the first department into which the visitor is ushered

ing machine which Norton Bros. manufacture for canning factories. The solder being in place, it is easily fused and is in just the proper quantity. The edge of solder on the cap also preserves it from rusting if the caps and cans are carried over from one season to another, and thus avoids what might be, and often has been, a serious loss. The manufacture of sheet solder is carried on in this factory by an original method, which is in itself a revolution in metallurgical methods, and will be more fully described in an additional article. It is sufficient to say here that Edwin Norton has solved the problem of rolling molten metal directly into sheets, which has so long baffled the leading metallurgists of the world, from Sir Henry Bessemer down. For months in one corner of this factory a machine has been in successful operation, producing from molten solder beautifully rolled sheets from 6 to 8 inches wide, $\frac{1}{16}$ inch thick, at the rate of 400 feet per minute.

A very large stock of tin plate is carried, and a special storehouse has been constructed for it, with every facility for making it a bonded warehouse in case the duty should be advanced as contemplated, when a much heavier quantity would at once be laid in, to be drawn upon as needed afterward.

An addition is just being built to this factory, which is 208 feet long by 137 feet wide, to be used for storage. This building is constructed of wood, with sheet-steel roofing and siding, to make it fire-proof externally. It is intended to hold 25,000,000 cans. It extends for its full length along the Chicago and Northwestern Railroad tracks, with doors placed at regular intervals of a car length apart, so that a number of cars can be loaded at the same time. In connection with the other buildings of the factory there is a frontage of 600 feet on the railroad, with doors arranged in this way for the whole distance. An elevated railroad runs from the car department through a covered passage to the new warehouse, and the cans roll along it by gravity to their destination, which is controlled by suitable switches, traveling over 1000 feet from their starting point. With such facilities it is not strange that a car can be loaded in an hour and a half and that over 100,000,000 cans can be shipped in a season from these works.

Railroads in Europe.

The French Government has recently published the following statistics showing the length in kilometers of the railroads in Europe at the close of the year 1887 and the new construction during that year:

Country.	Length of the Railroads in Europe.		Additions to roads in 1887.	
	Railroads end of 1887.		Kilo-meters.	Per cent.
Germany.....	30,570	1,221	3.18	
Austria-Hungary ..	24,708	1,308	5.59	
Belgium.....	4,702	168	3.71	
Denmark.....	1,969	4	0.20	
Spain.....	9,492	183	1.97	
France.....	34,234	891	2.67	
Great Britain.....	31,698	323	1.03	
Greece.....	605	90	17.48	
Italy.....	11,616	438	3.92	
Netherlands and Luxembourg.....	2,952	94	3.20	
Portugal.....	1,829	300	19.62	
Roumania.....	2,351	412	21.25	
Russia.....	28,518	880	2.96	
Servia.....	517	73	16.44	
Sweden and Norway.....	8,950	111	1.26	
Turkey, Bulgaria and Roumania.....	1,394	.....	.....
Malta.....	11	.....	.....
Totals.....	207,330	6,471	3.21	

This is equal to 129,210 miles, or far less than the railroad mileage of the United States.

A Cleveland, Ohio, paper says it looks very much as if \$4,000,000 or \$5,900,000 would be invested in new buildings in

that city this season. If the record for March could be taken for an average, the total for the year would be \$6,000,000 or \$7,000,000.

Milling Tool Lathe Attachment.

The piston of the Crown water meter is made of vulcanized rubber, and in shape somewhat resembles a widely-spaced gear, as shown by the outlined white part of the

rubber is pressed into shape. Bolted to the shears of the lathe are the two blocks A, Fig. 6, each of which is formed with two bearings. This construction was adopted in order to increase the rigidity of the bar B, which, fitting in the bearings, is supported at four points. This is an essential feature, since, as the size of this bar is controlled by the opening in the mold through which it passes, it is necessarily limited thereby, and all spring-

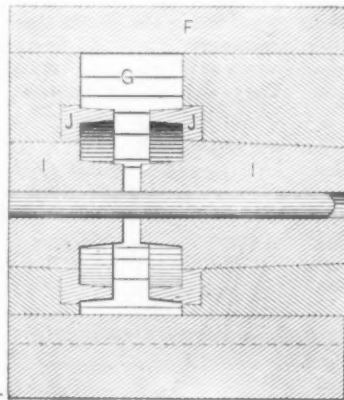
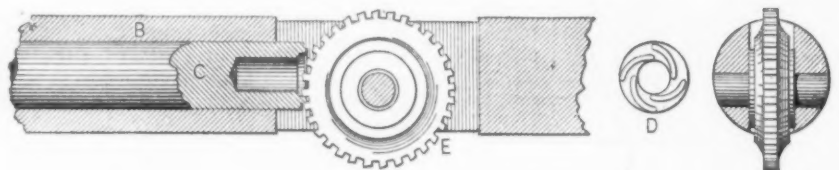


Fig. 1.—Section of Mold and Piston.



Fig. 2.—Section at Right Angles to Fig. 1.



Figs. 3, 4 and 5.—Longitudinal and Cross Section of Cutter and its Driving Shaft.

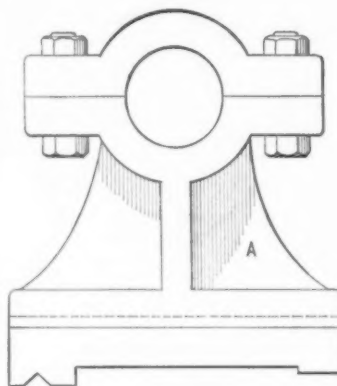


Fig. 6.—Sectional Elevation of Bar Bearings.

MILLING TOOL LATHE ATTACHMENT.

drawing, Fig. 2. This piston is made by pressure in a steel mold, which, in order to insure the perfect and easy working of the piston, which governs largely the accuracy of the meter, should be formed as nearly true as it is possible to make it. The tool herewith illustrated was designed by the inventor of the meter, L. H. Nash, solely for the purpose of attaining this object. It consists of few and easily-made parts—really only three—is easily adjusted on the lathe, and has been found to be most admirably adapted to milling the interior of pieces of such small size as to cramp the tool. The form of the mold and of the piston is given in Figs. 1 and 2, G representing the piston, F the mold and I J the dies between which the hard

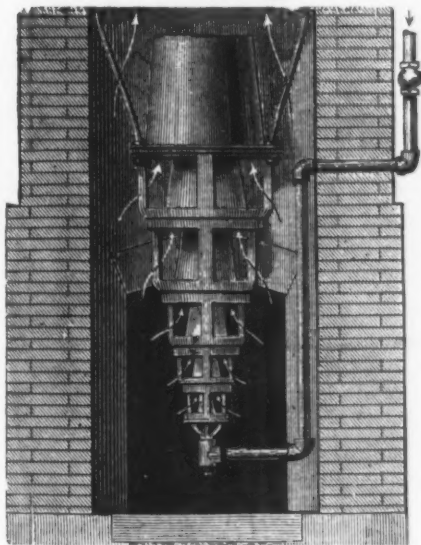
ing of the tool must be prevented in order to insure accurate cutting. One end of this bar is bored to form a bearing for the driving shaft C, which is driven from the headstock. The milling cutter E is mounted on a transverse shaft located a little below the axis of the bar B, and is placed within an opening cut through the bar, as shown in Figs. 3 and 5. The end D of the driving shaft C is formed with four segments of what we may term volute curves, with which the teeth of the cutter E engage. It is now evident that as the shaft C is revolved it will turn the cutter E, the cutting edges of whose teeth are not subjected to wear, as only their rear edges come in contact with the edges of the driving curves. This forms a rigidly-

held and simply-driven cutter. The mold blank is passed over the bar and the feed parallel with the bar, to bring the lower or projecting edge of the cutter into action. The cutter shown in Fig. 5 is for cutting the deepest parts of the mold, two others, one for each angle, being needed to complete the work.

We are indebted to Mr. Nash and to the National Meter Company for the loan of drawings from which our cuts were prepared.

Steam-Jet Chimney Draft Improver.

This machine is applicable whenever insufficient draft exists in chimneys which are too small for the purpose, or when the adjacent buildings are so high as to destroy the natural draft. It is constructed in accordance with the principle of the induced current, and while not decreasing the area, will create sufficient draft under all circumstances. The machine is composed of nozzles of gradually increasing area placed concentrically one above another. Entering the lowest and smallest nozzle is a steam-pipe leading from the boiler. The supply of steam is controlled by a valve



Steam Jet Chimney Draft-Improver.

located near the outside of the chimney. A slight opening of this valve is sufficient to induce a current of air through the side openings of the nozzles, which, multiplying as it ascends, produces a powerful suction at the base of the chimney, with very small consumption of steam. It is stated that these machines, which are being introduced by Amos Aller, 109 Liberty street, New York, have proved very successful wherever used.

Now that the Sandwich Islands have passed from the control of a puppet king into the hands of foreigners—mostly Americans and English—San Francisco papers suggest a movement on the part of the United States directed to the occupation of the strategic points, rather than await a threatened invasion by some other power. The Hawaiian group is becoming an important center of production and commerce. The sugar crop this year is reckoned at 130,000 tons—nearly twice as much as the Louisiana crop. Of rice the islands yield some 10,000,000 pounds annually, and the product of fruit and hides is large. Coffee has not yet been a success on the islands, but that will come. This fine territory, we are reminded, is "absolutely in search of an owner."

Japan has 2000 miles of railroads, 10,000 miles of telegraph wires and 30,000 schools, besides the Imperial University at Tokio.

Legal Decisions.

PROMISSORY NOTE—COMPOSITION WITH CREDITORS—NOTE FOR BALANCE OF DEBT.

A. made a composition agreement with his creditors, but he was induced by T., one of them, to give him a note for the balance of his debt. This note was not paid, and an action was brought upon it, to which H. set up the defense that it had been given without consideration, and he defeated T., who carried the case—*Tinker vs. Hurst*—to the Supreme Court of Michigan, where the judgment was affirmed. The Chief Justice, Sherwood, in the opinion, said: "It is very clear that the plaintiff should not recover in this case. All of the creditors by the composition agreement materially contracted with each other that the defendant should be discharged from their debts after the execution of the deed, and therefore any agreement between the debtor and any one of the creditors which gave the latter any special advantage is in fraud of the other creditors, and it cannot be enforced."

MARINE INSURANCE—PERILS OF THE SEA—EXPLOSION OF BOILER.

M. insured his steamboat Pilot against marine risks, and after its loss by reason of an explosion of its boiler he sued upon the policy. In the complaint the loss was alleged to have resulted from the explosion of the boiler, as the vessel sunk by reason of its having become unmanageable therefrom, and the company in reply alleged that it was not liable for an injury happening from an explosion. The contention of the company was sustained by the court below, and the case—*Miller vs. California Insurance Company*—was carried to the Supreme Court of California, where the judgment was affirmed. Judge Patterson, in the opinion, said: "Perils of the sea are defined by our code to be 'storms and waves; rocks, shoals and rapids; other obstacles, though of human origin; changes of climate; the confinement necessary at sea; animals peculiar to the sea, and all other damages peculiar to the sea.' The bursting of a boiler is not within any of the six causes named. Is it a danger peculiar to the sea? The same thing would have happened had the boiler and engines been on land had the same mismanagement taken place. The sea, waves and wind had nothing to do with it. It is impossible to say that this is a damage occasioned by a cause similar to perils of the sea on any interpretation which has ever been applied to that term."

PLEDGE—ACCOMMODATION NOTE—SALE OF PLEDGE.

A., B. and C. executed a note to H. for \$25,000 for his accommodation, and secured it by a pledge of their property. H. borrowed of S. \$15,000 on the note and security, and on default S. sold the pledge and bought it for \$15,000, and he then brought suit to foreclose the equity of redemption, claiming as the debt due him the face of the note, \$25,000, and he had judgment. The case—*Handy vs. Sibley*—was taken to the Supreme Court of Ohio, where the judgment was reversed. Judge Dickman in his opinion said: "A pledgee cannot, by a sale and purchase by himself of an accommodation note and mortgage under a special power of sale and purchase from the pledger, recover upon foreclosure of the equity of redemption more than the sum advanced by him."

FRAUDULENT SALES—DECLARATIONS OF VENDOR MADE BEFORE AND AFTER THE SALE.

E. was a merchant in the hardware business and he became embarrassed, and two of his creditors—R., to whom he owed \$960, and L., to whom he owed \$1300—insisted upon payment, and as he could

not pay he sold his stock of goods to their attorney-at-law in payment of their demands, who took possession of the stock and store, excluding E. therefrom. The signs of E. were taken down. A few days later H., a judgment creditor of E., seized the goods in the store in execution, and R. and L. sued in replevin to recover the property as belonging to them. On the trial of the case—*Rogers vs. Thurston*, sheriff—E. was a witness for the defendant, and he was permitted, against objection, to testify to the facts: 1. That he had delivered the property to R. and L.'s attorney on the express understanding that he was to still have them to sell until H.'s judgment was paid. 2. That he had informed H. about two weeks before the sale that the goods were worth about \$3000. On this testimony the defendant had judgment, on the ground that the sale was fraudulent as to him, and an appeal was taken to the Supreme Court of Nebraska, where a reversal was had. Judge Maxwell in the opinion said: "The testimony of E. was not admissible; his declarations could not bind the plaintiffs unless there was a conspiracy between them and E. to defraud his creditors by the sale. If there was such a combination, there should have been distinct proof of that fact made before the declarations were admitted. Here there was no attempt even to prove any conspiracy. As to the value of admissions arising out of a conspirator, a leading jurist says: 'Such evidence courts have found to be quite unreliable. It is not uncommon for different witnesses as to the same conversation to give precisely opposite accounts of it, and in instances it will appear that the witness deposes as to the statements of one party as coming from the other.' A substantial rule of evidence compels the reversal of this case. No admissions by a vendor made after he has parted with his title and not connected with the transaction are admissible against his vendee. As to the valuation made by E. before the sale, that simply tended to show that the sale was fraudulent, and such a fact could not be established in that way; some conspiracy, as we have said, must first be made out."

Western millers have been so long shut out from the British market by high prices in the United States that they are fearful of losing the export trade altogether. To learn the prospects numerous inquiries were addressed to correspondents in England, from whom replies have been received agreeing in all the main particulars. The general conclusion reached is that at the present time Great Britain is almost wholly independent of American supplies. Not only has the British product improved in quality, but Hungarian brands so closely resemble the best Minnesota products that the two qualities are scarcely distinguishable. Hungarian flour, therefore, is a formidable rival. Prices have undergone no material change. With reference to trade prospects the present condition is regarded as temporary, correspondents abroad being of the opinion that with a return of abundant crops and prices on an export level the American trade would speedily revive. Even at the present time if prices were satisfactory there would probably be quite a demand for American flour.

Compressible canvas boats, occupying only about 2 feet of space when folded, although capable of carrying 100 men, are being introduced on some of the Cunard steamships. In a trial at Boston 91 men were hurried into one of these boats with safety and rowed about the ship, giving the impression that they will be a valuable part of the ship's equipment.

The Protection of Blast Furnace Shells.

Samuel McClure and C. F. Phillips, of Sharon, Pa., have devised a method for protecting furnaces and like structures. The invention consists, first, in providing a brick structure—such as a furnace or stack—with a non-conducting water space filled with gravel or other coarse substance; further, in the peculiar arrangement of devices for supplying water to the whole or to any part of the water space; further, to a system of "observation boxes" located in the wall of the structure, by means of which the condition of the water space and furnace lining may be observed.

Fig. 1 represents a vertical section through the wall or lining of a blast furnace. Fig. 2 is a similar section, illustrating a modification. Fig. 3 is a horizontal section on the line *xx* of Fig. 1. A is the lining of the furnace, and B the external iron jacket surrounding it. C represents a space in the lining, which extends from the mantle D to the top of the furnace. This space may be formed as in Fig. 1, where an external course of brick is interposed between it and the jacket B, or as in Fig. 2, where the space is formed between the jacket and the brick-work directly. The entire space is filled with coarse gravel or some similar material, which of itself forms a non-conducting agent. This non-conducting space is supplied with water in whole or in any portion by the following system of water distribution:

E represents a water-pipe constructed in sections *b*, Fig. 3. This pipe is imbedded in the gravel filling the water space at a suitable height and extends horizontally throughout its entire circumference. The ends of the sections are closed and each one is provided with a number of perforations through which the water is admitted to the gravel filling, down which it percolates, thoroughly moistening it below each section of pipe. The sections *b* may be supplied with water from a circular pipe, F, surrounding the furnace and having a branch pipe, *f*, with a suitable valve, *f'*, communicating with each of said sections. A vertical pipe, G, communicates with the pipe F and with a tube, H, connected to any supply of water under pressure. Preferably, however, the pipe F is dispensed with, and each section *b* is supplied by means of a separate vertical pipe, like the pipe G, connected directly to the section and to the tube H and having a suitable cut-off valve. The tube H also surrounds the furnace and is supported by the bracket I. The tube is preferably made as shown in Figs. 1 and 2, with an open trough, J, into which the discharge-pipe K carries any excess of water from the space C, and which should communicate with a suitable drain. The tube and trough are built of iron sections bolted together as shown at *i*, Fig. 1, but may be formed in any other way that may be found desirable.

It will be evident from the description that water can be supplied to any or all of the sections *b* of the inner water-pipe, and thus that any portion of the entire circumference of the graveled space may be thoroughly moistened at will; also that the water may be shut off entirely and such space used as a dry non-conductor.

In order that the condition of the furnace lining and water space may be accurately observed, a series of observation boxes, L, are provided. These boxes are cast of any desired size—say from 4 to 6 inches in diameter—and are preferably square in cross-section. They are cast with a flange at their outer end, by means of which they are bolted to and within the iron furnace jacket, as shown at *l'*, Fig. 1. Their inner end extends a sufficient distance into the brick lining, and,

like the outer end, is open, so that the condition of the lining can be seen. Each box is provided with a slot which registers with the water space, and which while allowing the amount of moisture in the gravel to be ascertained, also permits of evaporation when from any cause it occurs.

The device has been applied to the two furnaces of the Stewart Iron Company, at

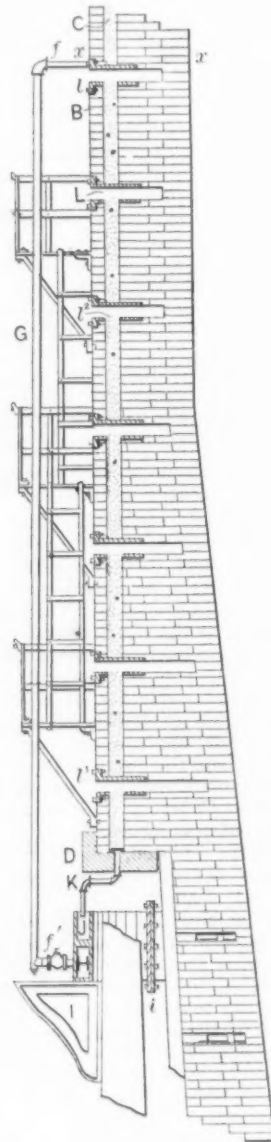


Fig. 1.

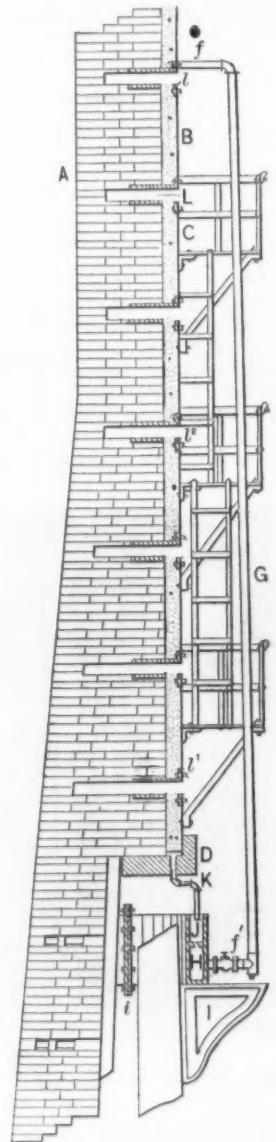


Fig. 2.

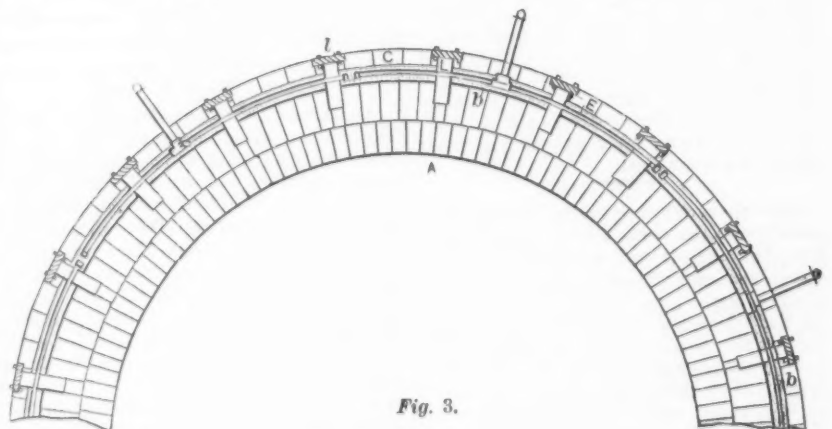


Fig. 3.

PROTECTION OF BLAST FURNACE SHELLS.

These boxes are placed around the entire furnace in tiers, the tiers being, say, 3 feet apart, and the boxes in each tier about a similar distance from one another. The tiers may be carried up to the top of the furnace, if thought desirable, or to any height below that, and the boxes in each tier are arranged so as to alternate in posi-

Sharon, Pa.; No. 1, which is 66 feet by 12 feet 8 inches, having been in blast 20 weeks, and No. 2, 70 feet by 13 feet 8 inches, 50 weeks. In both furnaces the space for the gravel is between the 4½-inch casing and the regular lining brick. In No. 2 furnace, the one longest in blast, the observation holes extended to within

13½ inches of the inside face of the well, and to date no appearance of wear is indicated in them. In No. 1 furnace they extended through the lining to within 9 inches of the inside of the face, as shown in our drawings. This 9 inches has not yet been worn away. The device has worked to the entire satisfaction of the Stewart Iron Company, and seems destined to be widely accepted by blast furnace managers.

THE WEEK.

It is remarked that while New York City is able to dispose readily of \$7,500,000 of bonds at rates paying the investors only 2½ per cent. per annum, the Canadian Government congratulates itself on borrowing \$20,000,000 on terms equivalent to 4½ per cent. There is a difference either in credit or skill in financing.

The late Isaiah V. Williamson, of Philadelphia, whose munificent endowment of a technical and trade school to be founded in that city will be a permanent memorial, gave during his lifetime \$4,000,000 to philanthropic objects. Outside and beyond the \$2,000,000 given for the building and support of the mechanical school just referred to, the appraisement of personal estate shows an aggregate of nearly \$10,000,000 in stocks, bonds and other securities. The largest single item in the list is the holding of Cambria Iron Company stock amounting to \$606,528. With a cash balance of \$23,488.45 in bank, Mr. Williamson's wearing apparel and strictly personal effects were too insignificant to be given a value.

A discovery of much archaeological interest has recently been made near the small town of Painted Cave, Tex. Laborers came upon a graveyard containing Indian and Aztec remains, arrows, battle axes, &c., and a score or two of the peculiar weapon of the Azatlan race were found. This weapon is a short metal axe, with blades of glass. The metal is supposed to be copper, but the specimens just found are so tarnished and incrustated by age and burial that this point has not yet been fully determined. A quantity of Aztec currency, consisting of bits of tin in shape like the letter T, was gathered from among the skeletons.

A Russian firm has obtained from the Italian Government the privilege of erecting petroleum tanks at Leghorn and other Italian ports, and has obtained from the United States machinery for the manufacture of tin cans and cases on the spot. The United States Consul advises that American manufacturers should adopt the same course.

The new Supervising Architect of the Treasury Department is J. H. Windrim, whose duties include the disbursement of large sums of money and the direction of numerous subordinates. He must possess exceptional abilities in the treatment and choice of architectural designs.

An automatic fire sprinkler in the establishment of Koch & Sons, manufacturing stationers, in this city, which was designed to operate only in case the soldering was melted, "went off" without provocation and did \$35,000 damage.

The bankers in New York who were receiving subscriptions to the stock of the American Meat Company (the dressed-beef trust) have withdrawn from the scheme and the subscriptions will be returned. It is understood that the Armour syndicate, which is a large customer of the Cotton-Oil Trust, brought pressure to prevent the threatened conflict of interests. J. H. Flagler, president of the Cotton-Oil Trust, and J. O. Moss, its treasurer, were

president and vice-president of the new meat company, but resigned. The new concern was to control 20,000,000 acres of ranch land, and was backed by important interests.

The completion of the new railroad bridge over the Ohio River at Cincinnati signalizes the commencement of a new system of traffic by the Baltimore and Ohio Railroad through their Western connections which is expected to build up a large business between the seaboard and the interior.

It is said that the Pennsylvania Railroad now has a controlling interest in three transatlantic lines of steamers, and as they have to make their regular trips the Pennsylvania can charge the regular export rates and then make the steamship companies carry the freight at a loss if necessary. Besides the Pennsylvania, the Grand Trunk has a contract to furnish a certain amount of freight to the Allan Line. It is problematic how the interstate law can reach these particular cases.

Judge Thayer, of the United States District Court at St. Louis, decides that a package of newspapers put on the top of a letter-box is no more in the custody of the Post-office Department than if put on the post-office steps, and that taking the package away is no offense against the law.

Robert Garrett and others, of Baltimore, propose to establish a sugar refinery in that city, and one-half of the \$1,000,000 capital required has already been found.

The New York Subway Commissioners ask the Legislature for an enlargement of their power, or rather the appointment of a new commission, to include the Mayor and other members of the municipal Government. They want to devise some plan which will prevent explosions, the improper tearing up of the streets by the gas and steam-pipe companies, and the leakage from the gas and steam-pipes so far as is possible.

Henry C. Squire's sporting establishment on Broadway was damaged nearly \$50,000 by flames that broke out in the engine-room. The explosion of gas from a broken fixture was among the destructive agencies.

It is reported that the Philadelphia Company has struck near Belle Vernon, 26 miles from Pittsburgh, one of the largest natural gas wells ever opened by a drill.

The annual meeting of the National Academy of Sciences was opened on the 16th inst. at Washington. It is probable that during its session a national society of geologists will be organized.

The British budget shows a diversity of nearly £2,000,000, the estimated values for the current year being placed at £85,000,000, while the expenditures will foot up to nearly £87,000,000, caused by increased army and navy expenses.

It is charged that the threatened strike against the insurance system of the Baltimore and Ohio by its employees is being fomented by agents of life insurance companies.

The condition of affairs along the Panama Canal is described as pitiful. A large number of men are out of work and are approaching starvation. Expensive machinery, being exposed to the weather, is deteriorating considerably.

The reports of the earnings of the railroads upon close study are not shown to be satisfactory. The *Financial Chronicle* reports that for the first three months of this year roads with a mileage of 71,312 miles had gross earnings of \$32,000,000, or \$1151 per mile, against \$76,900,000 on

68,205 miles for the same quarter of last year, or \$1112 per mile. Considering the great strikes and the unprecedented storms last year, these returns do not represent an increase in the volume of general business in proportion to the increase in mileage, even if rates were not changed at all.

It is stated that two independent sugar refineries at Philadelphia are selling their product at 6½ cents, as compared with 7 cents for granulated, which is the price of the trust refineries. In spite of the fact that the independent refiners are paying ½ cent more for raw sugar, they are reported to be making good profits.

If the plans now before Parliament are carried out England will during the next few years spend £21,500,000 upon her navy. It appears from this that England expects not only to maintain her present naval superiority, but to keep in advance of some of her neighbors who are devoting attention to war vessels.

The successful placing of bonds for the city of New York at 2½ per cent. is giving rise to considerable comment. It is stated that it is an intimation of the fact that the interest rate on safe investments is now rather below 3 per cent. per annum, 4 per cent. mortgages being hardly available in satisfactory quantities for institutions needing such collateral.

A comparison between the English ship Calliope and the Trenton shows the following figures: The former had 3000 horse-power engines and 2700 tons displacement. The latter had 3100 horse-power, but her tonnage was 3900.

Dr. Wendell Prime, Prof. Theo. Wight, Dr. Howard Crosby and Geo. W. Cable addressed the New York Prison Association lately, indorsing the Fassett bill.

At the St. Louis Exposition, to be held this fall, there will be a large and comprehensive exhibition of electrical appliances. The managers have offered every inducement to manufacturers of electric apparatus and expect each branch of the science to be fully represented. There will also be provided a large hall in which exhibitors can demonstrate the operation of their appliances.

In his message to the Mexican Congress, President Diaz states that contracts now in force promise an investment in mining enterprises of more than \$40,000,000. He states that the cultivation of the vine and the breeding of the silk-worm are progressing; that the telegraph system has been developed rapidly until the total length is now 21,200 kilometers. Financially, the position of the country is growing stronger, and with continued peace a prosperous future lies before Mexico.

Congress has appropriated \$400,000 for the construction of seven dynamite guns. According to Captain Zalinski, three of these will be placed at Sandy Hook, two at Fort Schuyler and two at Fort Wadsworth.

A very large jute factory is to be built by Platt, who is connected with the Standard Oil Company, on property adjoining the refinery on Newtown Creek, Greenpoint, L. I.

Experiments made by Leutz indicated that the use of aluminium for castings when gray iron was used was often positively detrimental. Its effect upon white iron was favorable, but care must be taken to strike the right temperature, which must be low. At the proper heat no irridescence is shown on the surface of the iron, which has a greenish tinge.

The product of all the furnaces in the Upper Susquehanna Valley, Pa., in March aggregated 16,184 gross tons.

MANUFACTURING.

Iron and Steel.

The newly-organized Steubenville Iron and Steel Company, located at Alikanna, 3 miles from Steubenville, Ohio, made their first muck iron on the afternoon of the 9th inst. Twelve new puddling furnaces are completed, making 25 in all. The company own about 140 acres of coal property, and as soon as the pumping out of the mine is finished it will be operated.

Gabel, Jones & Gabel, lessees of the Norway Furnace, at Pottstown, Pa., have recently struck a blue vein of iron ore of very excellent quality at Boyertown. Work on the new and second shaft which has resulted in this find was started in August, 1886. Black ore was struck in June of 1888 at a depth of 638 feet. The blue vein was struck on Thursday, the 4th inst., in a gangway driven out from the shaft proper to an estimated length of 320 feet, of which the actual length is 317 feet. This new vein is regarded as a good quality of ore and is the larger of the two. The total depth of the new shaft is 658 feet.

During the month of March, Rosena, a furnace at New Castle, Pa., made 5375 tons of No. 1 foundry pig iron, which amount is said to be 58 tons more than has ever been made in one month by any furnace in either the Shenango or Mahoning valleys.

A press dispatch from Chambersburg, Pa., under date of the 11th inst., says: "The Falling Spring Furnace here, which has been idle for five years, has been purchased by C. Burkhart & Co., who will put it in blast about July 1. The furnace of the Mont Alto Iron Company has also been put in blast."

Sarah Furnace, at Ironton, Ohio, made 303 tons of foundry pig iron week before last. This is the largest output for one week in the history of the furnace.

From a recent issue of the Ironton, Ohio, *Register* we take the following: "Messrs. Warner, the coke men, and Moore, the Bath County ore man, are in town trying to negotiate for the lease of big Etna furnace. We understand that there is a probability of a lease being made. Sarah Furnace is also included as a part of the lease."

With the exception of the tack factory all the departments of the La Belle Iron Works, at Wheeling, W. Va., closed down on Wednesday, the 10th inst., for an indefinite period.

The iron building department of the Shiffler Bridge Works, of Pittsburgh, Pa., J. W. Walker, proprietor, has recently completed for the Jefferson Iron Works, Steubenville, Ohio, an extension to their cast house, and has now on hand an extension to the cast house of Shoenberger, Speer & Company, of Pittsburgh.

The new furnace of the Jefferson Iron Works, at Steubenville, Ohio, was blown in on Tuesday, the 9th inst. It is 17 feet at the bosh and 81 feet in height and was erected by J. P. Witherow, engineer and contractor, of Pittsburgh. It was built to replace an old stack and has a capacity of about 150 tons per day.

The entire plant of the Penn Iron Company, Limited, at Lancaster, Pa., has been closed down for an indefinite period, on account of the iron market.

Notwithstanding reports to the contrary, the rail mill of the Allegheny Bessemer Steel Company, at Duquesne, is only being operated single turn. The rail-straighteners and others in the finishing department went on a strike several weeks

ago, refusing to accept the scale of wages offered by the firm. New men have been engaged, but not a sufficient number as yet to operate the plant more than single turn. The following agreement is presented to each employee for signature before entering into the firm's employ: "I do hereby pledge and bind myself, on my word of honor, not to join any labor organization while in the employ of this company, and also to give two weeks' notice to the company before leaving."

The Pennsylvania Tube Works, of Pittsburgh, have received an order from the Standard Oil Company for 100 miles of 8-inch pipe.

The Otis Iron and Steel Company, of Cleveland, Ohio, are erecting a forge 30 x 60 feet, which will contain eight hammers.

We are informed that the report that Cartwright, McCurdy & Co., of Youngstown, Ohio, were about to lease and put in operation the Himrod Furnace at that place is without foundation.

Carnegie Brothers & Co., Limited, of the Edgar Thomson Steel Works, at Braddock, Pa., are considering the question of erecting an additional blast furnace at that place, to cost in the neighborhood of \$200,000. Furnaces A and Y will shortly be blown out for extensive improvements. A new converter and other appliances that are to be put in this summer will considerably increase the output and cause a demand for more iron. This will make the erection of another furnace a necessity. At present the firm are operating seven blast furnaces at Braddock, six of which are running on Bessemer and the other on spiegel.

The Brooke Iron Company, of Birdsboro, Pa., have resumed work in their nail factory.

At a meeting of the stockholders of the Charlotte Iron Works Company, at Rochester, N. Y., a proposal was made to establish cast-iron pipe works. Although the project has been regarded favorably, no definite action was taken in the matter pending another meeting, which is soon to be held. The following officers were elected for the coming year: President, George B. Smith; vice-president, A. G. Yates; secretary and treasurer, A. S. Clarke.

The Plymouth Rolling Mill, of Conshohocken, Pa., have made an assignment to A. A. Lindsey, of the same place.

The Swindell & Smythe Company, Lewis Block, Pittsburgh, Pa., have just completed the following contracts: At the Kansas City Bolt and Nut Company, Kansas City, Mo., they put in an 18 x 7 feet regenerative gas mill heating furnace and artificial gas-producing plant, the capacity of furnace being more than sufficient to keep a 10-inch train running continuously, the gas being made from the commonest slack coal. For the McConway & Torley Company, Pittsburgh, they built six annealing furnaces, 8 feet 6 inches wide, and an open-hearth melting furnace for foundry purposes, which are running with natural gas; they also built a large regenerative gas open-hearth melting furnace and artificial gas-producing plant for the Lobdell Car-Wheel Company, Wilmington, Del., which is used for making car-wheels and heavy castings. The regenerative gas-annealing furnaces they have put up for Henry Disston & Sons, Philadelphia, Pa. (for which they have applied for a patent) are doing good work. They are annealing the plates, so that they are able to dispense with the die furnaces altogether. Both sides of the saw-plates are annealed at the same time by their improved arrangement. They have remodeled the pipe mill for the Riverside Iron Works, Wheel-

ing, West Va., putting in their gas-producers to take place of natural gas, which was used formerly in this mill, and have also built for them one large lap-welding furnace, and one lap-weld bending furnace.

For the Kelly & Jones Company, Greensburg, Pa., they built the entire brass melting plant, both open-hearth and crucible melting furnaces being used. The plant of Benjamin Atha & Co., Newark, N. J., has been entirely remodeled by them, their gas-producing apparatus being adopted throughout. They also built the 30-pot crucible steel melting furnaces, and a large mill heating furnace, which takes the place of five small ones, which were used previously. For the Addyston Pipe and Steel Company, Cincinnati, Ohio, they set three batteries of boilers and applied artificial gas to some of them. They also built the entire plant for John Illingworth & Co., Newark, N. J., consisting of 30-pot crucible steel melting furnaces, a gas-producing plant and several large and small mill heating furnaces. For the Johnson Foundry Company, Johnstown, Pa., they have put in a 15-ton air melting furnace, for making rolls, &c. The following plants they have closed contracts for are in the course of construction: For the Columbia Iron and Steel Company, Uniontown, Pa., they are building a 10-ton open-hearth steel melting furnace, and for the Montreal Rolling Mill Company, Montreal, Canada, they are making additions to their mill, by putting in additional gas-producing plant and two improved mill heating furnaces, and they have contracted with the Ramel-Conley Iron and Steel Company, Brewsters, N. Y., to put in for them a complete steel plant, consisting of open-hearth steel furnaces, artificial gas-producing plants, ladles, casting pits, cranes, cars and everything complete, ready to put the plant in operation.

Machinery.

The firm of McGill, Manchester & Co., general machinery manufacturers, at Pittsburgh, have been dissolved, and all the property and effects of the company have been assigned to J. J. McGill and Chas. E. Salter, who have reorganized under the firm name of McGill & Co., and will continue the business at the old location on Smallman street, in that city.

The Westinghouse Electric Company, of Pittsburgh, have just issued, in pamphlet form, a full list of patents controlled by that corporation.

Mackintosh, Hemphill & Co., proprietors of the Fort Pitt Foundry, at Pittsburgh, have already commenced to rebuild that portion of their works which was destroyed by fire on the 27th ult.

While pouring a heat to make a 4000-pound casting in the foundry of William Tod & Co., at Youngstown, Ohio, on the 11th inst., it exploded, hurling the molten metal in every direction. A number of the workmen were seriously injured, but no lives were lost.

The Springfield Iron Works, Springfield, Mass., have recently added new machinery and greatly increased the capacity of their forging department.

E. E. Garvin & Co., Lait and Canal streets, this city, have extended an invitation to those interested to inspect their new factory on April 30.

Messrs. D. H. and F. M. Merritt, of Marquette, have completed with the West Duluth Land Company an arrangement for the removal to Duluth of the Iron Bay Mfg. Company, now located at Marquette, Mich. The works make Corliss engines, mining machinery, hoisting engines, general foundry castings and boilers of all styles, marine and stationary. They have been in business there many years and have worked up a trade with the Michigan iron

ranges, the Gogebic and the Vermillion, and the silver and copper mines of Montana, besides a very large general business. The company will have a paid-in capital of \$300,000. The West Duluth Land Company have agreed to raise \$90,000, to be paid in when the enterprise is moved. The business of the concern will be managed by D. H. Merritt, who is made president and treasurer, and Frank Wilbur Merritt, secretary and general manager; C. Markell, vice-president. Directors are as follows: D. H. Merritt, F. M. Merritt, Capt. Jos. Sellwood, O. H. Simonds, C. Markell. There will be seven distinct buildings, besides oil-house, fire-cistern, engine-house and stack. All will be of brick and all but the machine shop and pattern-house will be one story high. The machine shop will be two stories, with one end raised to three for office and other purposes. It will be 60 x 275 in ground plan, with an office at the end fronting on Fourth avenue east 20 feet deep, making the entire side length of the building 295 feet. Built up close to this, and at right angles with it, will be a structure 260 feet long and 60 feet wide, the first 60 x 60 feet of which will be a blacksmith shop, while the remaining 200 x 60 feet, stretching along Fourth avenue east, will be a general foundry. Close behind this will be a pattern shop, 40 x 60 feet, and a coal and sand house, also 40 x 60. Across a clear space and near the east end of the long machine shop will be the boiler shop, also 60 feet wide and 150 feet long. Further down toward the slip will be a two-story pattern-house, practically fire-proof and 60 x 100 feet, and a general storehouse, 40 x 85 feet. Built up against the machine shop will be two buildings, each 30 x 40 feet, in one of which will be located the engines and boilers of the establishment.

Hardware.

Excelsior Mfg. Company, Birmingham, Conn., makers of edge tools, will soon erect a new factory at Shelton, Conn. The new structure will be of brick, 280 x 40 feet and three stories high.

Champion Blower and Forge Company, of Lancaster, Pa., are meeting with an excellent demand for their Champion self-feed upright blacksmith post drill. A representative from *The Iron Age* visited their place of business a few days ago, and from the daily mail just received was shown letters containing orders from New York, Pennsylvania, Ohio, Indiana, Michigan, Illinois and Texas.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have furnished the ornamental artistic metal-work for the Exchange Bank, Franklin, Pa.

The Sequatchee Hoe and Tool Company, South Pittsburg, Tenn., have contracted for such additional machinery as they will need for the manufacture of shovels.

C. E. Hudson, Leominster, Mass., has been putting in special automatic machinery for the manufacture of apple parers, and otherwise increasing his facilities for turning out better work and cheaper than ever before.

W. G. Avery, president of the W. G. Avery Mfg. Company, Cleveland, Ohio, has received notice from the Commissioner of Patents for Canada that a Canadian patent was issued to him April 2 covering elevator buckets, welded, brazed and fused.

The strike at the Ames Shovel Works, of North Easton, Mass., which lasted seven weeks, has been settled.

Miscellaneous.

The Savage Fire-Brick Company, of Pittsburgh, who have for six months been shipping large quantities of brick to Birmingham, Bessemer and other Alabama points, have just secured a contract from

a new furnace company at Sheffield for 2,500,000 bricks. These will cost \$50,000 at the manufactory.

The Chas. Munson Belting Company, of Pittsburgh, have received an order at their Chicago branch house from the Minnesota Brush Electric Light Company, at Minneapolis, for 140 feet 68-inch, 60 feet 36-inch and 70 feet 30-inch leather belting. The 68-inch belt, it is claimed, is the largest leather belt made in this country.

A press dispatch from Findlay, Ohio, under date of the 12th inst., says: "Two enormous gas wells were struck here today, one with a capacity of over 30,000,000 cubic feet and the other with not less than 20,000,000 feet. The former is owned by the city."

Reports from South Pittsburg, Tenn., are to the effect that the different manufacturing concerns there are taxed to their utmost to fill orders, and the city is regarded as growing on a firm basis. Electric lights are being put in, an additional pump is being added to the water-works, and other enterprises are progressing.

Randolph & Clowes, who began business about two and a half years ago in a portion of the old mill of the late firm of Brown & Bros., Waterbury, Conn., have recently purchased the remainder of the plant, consisting of a number of buildings, covering nearly 8 acres. This acquisition will more than double the capacity of Randolph & Clowes, and will be used to extend the production of seamless drawn brass and copper tubes and patent seamless drawn copper house boilers, and for the rolling of brass and copper for all purposes. The recently purchased buildings are almost bare of machinery, most of the old equipment having been sold some time since, so that Randolph & Clowes will have an opportunity of putting in the latest improved machinery and appliances, which they purpose to do. At present there are in their works several hydraulic machines of great capacity, operated by a great pump and an accumulator, weighing 70 tons, and costing from \$10,000 to \$25,000 each. The new portion of the plant will be in running order in a few months.

The Canton Steel Roofing Company, Canton, Ohio, are now doing business and completely settled in their new plant, which is referred to as exceptionally complete. They report an increase of business during the first quarter of the year of more than 30 per cent. over last year.

Among new corporations recently authorized in the State of Illinois are the following: Sampson Steam Forge Company, Chicago; capital, \$100,000; for the manufacture of locomotive frames and general forging; incorporators, S. R. Wilson, F. J. Smith, J. W. White and F. J. Wilson. The Chicago and Minnesota Ore Company, Chicago; capital, \$2,000,000; for mining, transporting, reducing and refining iron and other ores, dealing in securities, corporations, and other personal property; incorporators, Charles P. Coffin, Austin W. Grenville and Arthur C. Ellis.

The National Tube Works Company, McKeesport, Pa., report that they have sold over \$8,000,000 worth of their kalamine pipe since the patents were issued. This pipe is used for a variety of purposes, principally water, oil and gas. There are 5900 men at present in the employ of the above company, and their works comprise 60 acres under cover. The daily output is 1000 tons of finished product, including standard steam, gas and water pipe, boiler tubes, &c.

Evans & Howard, St. Louis, Mo., favor us with a recently-issued catalogue of fire-brick, gas retorts, &c., St. Louis standard

sewer-pipe, &c., which they manufacture. In an introductory note to the trade they direct special attention to their 9-inch brick cupola blocks, tiles and shapes, of which they keep a large stock on hand. They own their bed of fire-clay and have exceptional facilities for distributing their product by rail. They also refer to their two large factories for the production of sewer and culvert pipe. In addition to the goods mentioned the catalogue illustrates cost prices of furnace linings, paving brick, drain tiles, well tubing, chimney-flue pipe, &c.

The Johnstown Steel and Iron Casting Company, of Johnstown, Pa., manufacturers of steam and hot-water radiators, have been in existence for about two years. The company is composed entirely of business and professional men who cannot give the business the necessary attention, and they have decided to lease the plant with the full equipment. It is located at Sheridan Station, on the line of the Pennsylvania Railroad, and is said to be in good condition in every respect.

Brazilian Trade.

The anomalous condition of American trade with Brazil is the subject of discussion in Rio papers, with the object of showing that while Brazilian products as a rule are admitted into the United States either free or at a low rate of duty, the Brazilian Government makes no corresponding concessions. The *Rio News* says: "While the United States has voluntarily abolished all duties on coffee, rubber, hides and horns and many medicinal plants, all products of Brazil, and is even considering the question of reducing or abolishing duties on sugar—another Brazilian product—here in Brazil the duties on American products have been rigidly maintained, in some cases at an unjustly high figure. And while the United States takes over half the coffee produced in Brazil, considerably over half of the rubber product, fully half of the hides and horns exported, and about two-fifths of the sugar crop—or, in the aggregate, about one-half of the entire exports of the country—the imports from the United States into Brazil barely reach one-seventh of the total importation. This certainly is not an indication of reciprocity in trade, nor of an overpowering sentiment of friendship and neighborly interest. Although repeated complaints have been made, kerosene still pays from 140 to 160 per cent. customs duties on its cost, lumber nearly 90 per cent. and lard 52 per cent, while a great percentage of American imports, such as furniture, cotton, linen and woolen fabrics, hardware, cutlery, clocks, hams, butter, &c., pay over 50 per cent. on cost and freight." It is a curious circumstance that the one monarchy on this continent should be especially favored by the United States in its commercial relations, rather than countries like Mexico, with whom it would most naturally sympathize as a sister republic.

The Water Bureau of Philadelphia awarded contracts for cast-iron pipe as follows: To the Mellert Foundry and Machine Company, of Reading, 20-inch pipe, 1 $\frac{1}{2}$ ¢ cents per pound; 30-inch pipe, 1 $\frac{1}{2}$ ¢ cents per pound for the first 600 lengths and 1.24¢ for the second 600; small specials, 2 $\frac{1}{2}$ ¢ cents a pound; large specials, 2 $\frac{1}{2}$ ¢ per pound; to Daniel L. Dawson, breeches-pipe, 3 $\frac{1}{2}$ ¢ cents per pound. The contract for large specials was divided between Dawson and the Mellert Company.

A sample taken from a pile of magnetite ore, approximating 400 tons of New Bed ore, at Mineville, in the Lake Champlain district, N. Y., to get at an average, showed by analysis 72 per cent. of iron and 0.018 per cent. of phosphorus.

The Iron Age

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The Outlook for Lead.

The statistics for the production of lead recently published by the United States Geological Survey are instructive because they show how hopeless was the struggle of speculators last year to maintain high prices in the face of a very large increase in the output, and because they indicate that for the near future there is little hope for an advance in the price over present figures. In fact, the question may well be raised whether under certain circumstances lower figures are not probable.

For ten years the make in the United States has been as follows:

Production of Lead in the United States. Net Tons.

Year.	Desilverized.	Non-argentiferous.	Total.
1878.....	64,290	26,770	91,060
1879.....	64,650	28,130	92,780
1880.....	70,135	27,690	97,825
1881.....	86,315	30,770	117,085
1882.....	106,875	29,015	132,890
1883.....	122,157	21,800	143,957
1884.....	119,946	19,332	139,278
1885.....	107,437	21,975	129,412
1886.....	114,829	20,800	135,629
1887.....	136,552	25,148	160,700
1888.....	151,465	29,000	180,555

The desilverized lead is that produced in the Rocky Mountains containing silver and subsequently specially treated to extract the silver and refine the lead. With the exception of a small quantity, which is bought by the refiners for special purposes, the lead produced in Missouri and Kansas does not go through the same channels, roughly speaking. The principal increase, it will be observed, is in desilverized lead, carrying the 1888 product to double the figures reached a decade since. The production of late years has probably been unjustly credited to the United States. Since 1886 an important percentage of it is really the produce of Mexican miners whose ores are shipped to smelting works in the United States for treatment. The magnitude of this business for 1886 is not known. For 1887 it was estimated at 15,000 tons, while for 1888 an official report of the Bureau of Statistics shows the lead contents of Mexican ores imported to have been 28,636 tons of 2000 pounds. Deducting this from the figures given for the production of desilverized lead, we find that the American product was 120,000 tons in 1887 and 123,000 tons in 1888. With the non-argentiferous lead added, the yield of the mines in the United States was roughly 145,000 tons in 1887 and 152,000 in 1888. In other words, our domestic supply has not developed very rapidly.

A widespread agitation exists throughout the Rocky Mountain camps and among the Missouri and Kansas miners against the continuance of imports of Mexican ore, and manufacturers and dealers in white lead, sheet lead, pipe and shot should

closely watch developments in the coming struggle, since the decision reached is likely to have considerable influence in shaping the course of the metal for years to come. A peculiar condition of affairs has led to the development of the imports on a large scale of lead in Mexican ores. Like the majority of mines in the Rocky Mountains, some Mexican ores carry both lead and silver. Under our tariff silver ore is duty free, while lead in ore pays 1½ cents a pound. The delicate question naturally arises when an ore containing both metals ceases to be a lead ore and becomes a silver ore. Following its general practice, the Treasury Department has held that the classification must be guided by the decision which is the component of greater value. If, therefore, a lead ore imported happens to have enough silver in it to make its contents of the precious metal figure out to be of greater value than the lead, then it comes in free.

It is under this ruling that the large quantities of the baser metal have entered to compete with the domestic product. Two large smelting plants have been built at El Paso to treat these ores, and the American railroads that have pushed into Mexican territory have derived a large revenue from their transportation. Naturally a vigorous protest has arisen, especially since the speculation collapsed last October under the pressure of this very supply, and prices have materially declined. Colorado, Utah, Idaho and Montana are deeply affected by the matter, especially the latter, with their allied railroad interests. During the past two years the Cœur d'Alène district in Idaho, once the scene of a mad stampede for gold placers, had developed more substantial and lasting wealth in its argentiferous lead mines. It is estimated that in 1888 the district shipped ore and concentrates whose metal contents aggregated not less than 22,000 tons. Additional railroad facilities have been provided and are being supplied, and more concentrating works are building, so that local authorities promise an output of not less than 30,000 tons, and possibly 33,000 tons, of metal providing adequate prices for lead can be secured. Montana has a deep interest in these developments, because the new State is to do the smelting, two large works having been built during 1888, one at Great Falls and the other at Helena. Thus far the new Idaho district has done little more than fill the gap caused by the decline in some of the other Rocky Mountain States and Territories, but the miners and smelters naturally fear that if Mexico continues to crowd the market their own development will be checked, if not imperiled.

It is true that the latest advices are that the new railroads which have connected Gulf ports in Mexico proper with the mining regions in that country are encouraging the export of the ore to Europe, and that for that reason an important diversion is taking place. But it remains to be seen how long the European markets are going to stand up against the promised influx of lead from the new Australian mines. Should that prove to be serious, then the current may flow back into the same channels which it has occupied during the past year. With Idaho in the Northwest and Mexico in the Southwest rushing lead into our markets, and the

older Colorado and Utah districts striving to hold their own, the supply of lead promises to be very ample—too large, in fact, to allow of any advance, and tending rather to aid a further decline. Should the efforts of those succeed who are eager to stop the free importation of Mexican lead as silver ore, then matters would assume a very different aspect. The balance would then tend decidedly to swing in the other direction. It is for this reason that those in any way interested in the metal should watch for any developments in Washington.

The Advance of Steel.

There is much food for study in the statistics just published by James M. Swank, general manager of the American Iron and Steel Association. What is particularly interesting is his repetition of an effort to secure data concerning the quantity of steel rolled for other purposes than rails. This is, of course, the principal though not the only factor in the question as to what extent steel has superseded iron. Mr. Swank has followed his usual method of computation, as follows:

	1887. Net tons.	1888. Net tons.
Bessemer steel ingots.....	3,288,357	2,512,500
Less 12½ per cent. for oxidation and crop ends.....	411,045	351,563
Finished Bessemer steel....	2,877,312	2,460,937
Steel rails, except from purchased blooms.....	2,290,197	1,529,832
Steel not in rails.....	587,115	931,105

Mr. Swank has compiled similar figures for a series of years, as follows:

	Net tons.
Bessemer Steel not Marketed as Rails.	
1882.....	150,045
1883.....	198,874
1884.....	231,400
1885.....	414,435
1886.....	473,907
1887.....	587,115
1888.....	931,105

To this, of course, must be added the output of finished goods from open-hearth steel, and that rolled from imported slabs, blooms and billets. The product of open-hearth steel was 352,036 net tons, equal, using the same system, to 303,770 net tons. Add about 26,000 tons of steel hoops and sheets, 100,000 tons of blooms and billets and 90,000 tons of steel wire rods imported, and a total is reached of about 1,450,000 net tons. Last year we estimated the consumption, in a similar manner, at 1,300,000 tons. In 1888 the American works displaced about 210,000 tons of foreign material and captured an increase of 150,000 tons.

Now, in 1887 the total of rolled iron was 2,588,500 net tons, as compared with 2,411,654 net tons in 1888, a decline of 176,846 tons. In other words, steel displaced iron to the extent of about 150,000 tons, and drove out foreign material to the extent alluded to.

Mr. Swank has this year again presented details of the production of rolled steel, which have been rendered more complete by the collection of statistics concerning the production of wire rods. He makes the total of rolled steel 1,201,885 net tons, including 216,174 tons of cut nails, 213,694 tons of plates and sheets and 772,017 tons of other rolled steel. The latter, of course, includes 298,770 net tons of steel wire rods, the total production of rods, by the way, having been 313,341 net tons. The consumption was considerably greater, including as it did about 26,000 tons of

imported plates and sheets, and at least 90,000 tons of foreign wire rods, drawn at barb-wire and wire-nail works.

Brazilian and Argentine Finances.

Of all the South American countries Brazil and the Argentine Republic are progressing most rapidly at present, and unless something unforeseen happens may continue to do so for some years to come. In May last year slavery was abolished in Brazil, field labor being disorganized thereby very little except in the cultivation of current food supplies, so that in all this year large amounts of Indian corn will have to be imported from the United States and of rice from Burmah. No disorders were caused by the freedmen anywhere; they picked the coffee crop, though slovenly, and if 80,000 tons less of sugar were produced in 1888 than in 1887, it was due to the drought and not to a lack of plantation hands. Instead of procuring Chinamen and Indian coolies to take the place of any negroes who might flock to the cities, the coffee planters of San Paulo and other localities situated in the mountain district liberally facilitated European immigration, following therein the example of the Argentine Republic. From an average immigration of 27,390 a year for ten years, the figures leaped in 1888 to 130,000 in the two ports of Rio and Santos alone. This year their number may swell to 200,000. The Argentine Republic received last year 175,000, and it is believed more than 200,000 may be looked for in the current year. What troubles the Argentines, however, is that so small a portion of the immigrants—only about 10 per cent.—devote themselves to agriculture. They see clearly enough that it is only the rapid development of their natural resources that can enable them to pay for the vast system of internal improvements now under way. Over 5000 miles of railway were under construction last year, and 3000 more are planned for 1889; but this means an addition of \$75,000,000 to the national debt. Ten thousand houses were built in Buenos Ayres in 1888, and the city has now a population of nearly 500,000, but this means, just as does the enormous premium on gold, feverish commercial speculation. So strongly does the Government feel that more labor is wanted, not for railroads and harbors, but for farms, that it is seriously proposing to restrict immigration, of Italians at least, to those who will give themselves to agriculture.

The public indebtedness of the Brazilian Government last year was 2,831,128,631 milreis, of 54 cents American. The budget for 1889 estimates the expenditures at 173,415,408 milreis and the revenue at 247,200,000, resulting in a deficit of 26,215,408 milreis. The real cause of the recurring deficits has been the heavy outlay on schemes of internal improvement, principally on railroads. If the debts of Brazil are greater than those of either Chili or the Argentine Republic, so is the foreign commerce, so is the national income, and so in many respects are the public resources. With all the wealth of the country pledged to pay its debts, and with a most honorable record of punctual fidelity to its obligations in the past, it is not surprising that Brazilian bonds have such an excellent footing in London, or that the adminis-

trators of Brazil's finances look forward so confidently to a prosperous future.

On March 31, 1888, the consolidated Argentine national debt amounted to \$140,355,772, against \$147,791,257 on March 31, 1887. The outlay last year was \$51,086,536 and the income \$53,743,800. The spirit of enterprise in the republic probably reached its climax in 1888, when during the first 11 months—without counting banks and railroads—no less than 51 stock companies were formed, with an aggregate capital of \$73,000,000. During the first 10½ months Europe absorbed last year £28,702,766 in the shape of Argentine loans of all sorts, national, provincial, municipal, railway, &c. The Netherlands Bank has declined to advance any money on Argentine securities. During the ten years between 1877 and 1887 the following items showed the percentage of increase set against each: Income of the State, 375; foreign commerce, 260; sea-going vessels entered, 324; area under culture, 500; value of crops, 360; telegraphs, 324; railroads, 330; immigration, 385; bank capital, 315; paper money in circulation, 247; public debt, 180; annual interest thereon, 160. Brazil cannot show a similar percentage of increase in the items named, because it had the incubus of slavery on its shoulders. Now that the latter is out of the way and coffee and sugar command high prices, all this is likely to be changed.

If only a portion of the work under construction which the *Railway Age*, of Chicago, reports in a special article, widely quoted, were taking iron and steel, our markets would have a very different complexion. Our contemporary figures out that during the first three months in the present year "the work of railway construction or inception has been going on in the name of 666 companies, representing a contemplated mileage of over 53,400 miles, of which over 14,800 appear to be at the present time under construction or under contract for gradual completion." The iron trade will receive this pleasing information with much amazement and some incredulity. The rail manufacturers particularly, who flatter themselves that they keep their thumbs very near the pulse of the patient, will be startled. Perhaps they are able to supply information which will take much of the elasticity from the buoyancy of our contemporary. It has been remarked again and again by nearly every leading manufacturer of rails in the country, in interviews with representatives of *The Iron Age*, that there are a good many inquiries in the market, but, as one of them put it, the majority of them are "cats and dogs." If rail-makers were to take bonds by the ream prettily printed in exchange for good metal they could fill their order books for a year to come. The most amazing propositions come to them, to be dismissed with a shrug or a smile, and the chase for *bona fide* business goes on as vigorously as ever. We hear of offers to take rails from a mill singled out by the discriminating buyer, provided the manufacturers will advance a trifle of \$10,000 or \$15,000 per mile to finish the grading. Then the generous builder will give the contract at \$26 at mill in exchange for long-time notes indorsed by the projectors and backed by bonds as collateral. The rail mills are not doing business in that

way, and until it becomes very much clearer than it is now where the money is to come from to carry on the mileage "under construction" iron and steel manufacturers will remain very conservative.

The Rise in Sugar.

For a year past the consumption of sugar has been gradually outrunning production; this fact was pretty generally known and the position of the staple all along inspired confidence, yet speculation was held in check by the rather abundant yield of beet root on the Continent of Europe in 1888. If the cane-producing countries in America and India had turned out their usual quota, a notable appreciation in the value of the staple might perhaps have been avoided, but it so chanced that the September cyclone in Cuba curtailed that crop a couple of hundred thousand tons, that Brazil had a shortage of 90,000 tons and that the small West India islands were backward and also produced less. While the United States were thus compelled to fall back on Java, Manila and beet-root sugar in Europe for the want of a sufficient supply from Cuba and Pernambuco, England had to buy beet sugar (for the lack of colonial cane sugar) on the Continent, where a group of speculators had got partial control of the market. Meanwhile, in spite of higher prices, this country consumed last year over 10 per cent. more sugar than in 1888, and has this year continued at the same rate. On April 11 the stock on this coast at the four ports had thus dwindled down to 19,083 tons, against 105,239 at the same date last year. In Cuba the available sugar is also held by speculators, and the price they dictate has to be submitted to. Last week five Spanish steamers were chartered to take some of this sugar to New York, Philadelphia and Boston. This shows how pressing the demand must be. At the lowest point last year fair refining Cuba was sold in New York at 4½ cents; it now commands 6½ cents. On April 1 the visible supply in Europe and America, Cuba included, was 1,026,061 tons, against 1,309,168 in 1888 and 1,467,669 in 1887. Our greatest consumption is during the summer months. Should there be a bountiful fruit crop our requirements will be very large unless checked by excessively high prices, which for aught we know may rule by that time. With the grip which the Sugar Trust has on the market the outlook for consumers is anything but pleasant under the circumstances, but those who speculate in Sugar-Trust certificates have some cause for feeling bullish.

A good many people in the iron trade seem to be puzzling over the question why the steady advance in prices abroad has not a direct effect upon our drooping markets. The fact is forgotten that, after all, the influence of foreign markets upon our own is really only negative, that prices abroad influence ours only when our production is unable to supply the demand, except at a heavy advance, or when the markets in Europe are relatively much weaker than ours. For some time past conditions have been unusual. In former years the first impulse in an upward movement came from this side of the Atlantic. Lately the rise there has taken place in spite of an absence of a demand from us. Their own and other countries throughout the world have been buyers to such an extent that the gap

caused by the falling off in orders from us has not alone been filled, but there has been business beyond that. The result has been that they have been independent of us, and that we have not been influenced by them. Home competition with us is alone responsible for driving prices to present low figures. The foreign markets have had nothing to do with it. We cannot hope for an improvement of any moment until the demand has developed notably or production has been lessened by the exhaustion of weaker concerns. The only possible source of uneasiness which the present condition of the foreign markets may cause, so far as the more distant future is concerned, is that the boom abroad may collapse by the time we have reached the turning point. That is a contingency which it is hardly worth while discussing now.

The Charcoal Furnaces April 1.

The current product of the charcoal furnaces throughout the United States fell off in March, and the plants entered April with a lessened production. Thus, although the same furnaces were at work in Michigan, the March product was only 15,189 gross tons, as compared with 15,365 gross tons in February, a month shorter by three days. In detail the record is as follows:

Charcoal Furnaces April 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	7	560	7	530
New York.....	10	3	412	7	520
Pennsylvania.....	23	11	115	12	959
Maryland.....	1	1	188	0	451
Virginia.....	23	1	42	22	904
West Virginia.....	3	0	0	3	105
Ohio.....	13	6	436	7	842
Kentucky.....	1	1	0	0	155
North Carolina.....	9	1	70	8	70
Tennessee.....	2	1	614	1	1,390
Georgia.....	10	9	1,780	1	54
Alabama.....	25	11	3,430	14	3,370
Michigan.....	3	2	580	1	100
Minnesota.....	1	0	0	1	150
Missouri.....	10	4	1,530	6	810
Wisconsin.....	1	0	0	1	173
Texas.....	1	0	0	1	120
California.....	1	1	175	0	0
Washington.....	1	1	181	0	0
Oregon.....	1	1	181	0	0
Total April 1....	167	53	10,173	114	10,956
Total March 1....	167	55	11,081	112	10,981
Total Feb. 1....	167	62	11,219	105	10,406
Total Jan. 1....	169	67	11,946	102	9,822
Total Dec. 1....	169	71	12,286	98	9,397
Total Nov. 1....	169	73	12,724	96	8,941
Total Oct. 1....	175	71	11,619	104	9,083
Total Sept. 1....	176	67	11,243	109	10,004

In New York Copake is again at work, and since the 1st two stacks have blown in in Pennsylvania. In the Hanging Rock region of Kentucky both furnaces are now idle, Bellefonte having stopped on the 18th ult.; to put in a new hearth and a Player hot-blast stove, which it is expected will be completed by May 1. In Maryland Muirkirk is again out. In Virginia Reed Island resumed on the 15th ult.; Walton is getting ready; Beverly and Cedar Run are to follow early in May, and Foster's Falls in June. In Ohio Bloom is again a producer, having had a good start. Mount Vernon is to blow in at an early date. In the Northwest Hinkle continues its brilliant record, having made 3004 gross tons in 31 days. In Alabama Round Mountain resumed, and Gadsden has begun work since the 1st. Tecumseh suffered from a stoppage of 16 days during March. In Texas the Old Alcalde blew out during March.

Reports from every furnace in the Mahoning Valley, Ohio, show the product to have been 38,506 tons in March.

Our Iron and Steel Production in 1888.

Mr. James M. Swank has just published his annual statistical report for the American Iron and Steel Association, of which he is manager, the following table showing the production of the leading iron and steel products in 1888, in comparison with the figures for the three preceding years:

Net tons of 2,000 lbs. (Except nails.)	1886.	1887.	1888.
Pig iron.....	6,365,328	7,187,266	7,268,507
Bessemer-steel ingots.....	2,541,493	3,288,377	2,812,500
Bessemer-steel rails.....	1,763,697	2,354,134	1,562,631
Open-hearth steel ingots.....	245,250	390,717	352,036
Open-hearth steel rails.....	6,255	19,213	5,261
Crucible-steel ingots.....	80,000	84,421	78,713
Crucible-steel rails.....	2,259,943	2,565,438	2,397,402
Iron rails, except rails.....	23,079	23,002	14,252
Kegs of cut nails—100 lbs.....	8,160,973	6,908,870	6,493,501
Pig, scrap & ore blooms.....	41,900	43,306	39,875

The total production of pig iron in the United States in 1888 was 7,268,507 net tons, or 6,489,738 gross tons, the largest yearly production ever attained in this country, exceeding by 72,590 gross tons the extraordinary production of 1887. The total production in 1887 was 7,187,266 net tons, or 6,417,148 gross tons. The production in the first half of 1888 was 3,382,503 net tons, and in the second half it was 3,886,004 net tons, or 3,020,092 and 3,469,646 gross tons respectively.

In the following table the production of pig iron in 1888 and in the three preceding years, classified according to the fuel used, is given in net tons:

Fuel used.	1885.	1886.	1887.	1888.
Net tons.				
Bituminous.....	2,675,635	3,806,174	4,270,635	4,743,980
Anthracite and coke.....	1,176,477	1,655,851	1,919,640	1,648,214
Anthracite alone.....	277,913	443,746	418,749	277,515
Charcoal.....	309,844	459,557	578,182	598,789
Total.....	4,369,869	6,365,328	7,187,266	7,268,507

For a series of years the production in this country and the estimated consumption were as follows, in gross tons:

Production.	Consumption.
1881.....	4,144,254
1882.....	4,629,323
1883.....	4,595,510
1884.....	4,097,868
1885.....	4,044,526
1886.....	5,683,329
1887.....	6,417,148
1888.....	6,489,738

The following table shows the production of Bessemer-steel ingots, the output of steel by the Clapp-Griffiths process being added in the totals and given separately also under it:

Ingots.	First half 1888. Net tons.	Second half 1888. Net tons.	Total 1888. Net tons.	Total 1887. Net tons.
Pennsylvania.....	729,993	862,636	1,592,629	1,752,445
Illinois.....	321,115	299,741	620,856	857,513
Other States.....	330,180	295,856	626,036	678,999
Total.....	1,381,288	1,458,232	2,839,520	3,288,957
Clapp-Griffiths only.....	36,070	45,087	81,157	68,679

The proportion of steel rails of the whole was very much smaller than usual, the figures standing as follows:

Rails.	First half 1888. Net tons.	Second half 1888. Net tons.	Total 1888. Net tons.	Total 1887. Net tons.
Pennsylvania.....	420,101	491,105	911,206	1,221,280
Illinois.....	256,823	231,816	488,639	728,528
Other States.....	98,337	31,650	129,987	340,382
Total.....	775,261	754,571	1,529,832	2,290,190

An interesting set of figures is added to show the output of the Chicago and Pittsburgh districts, the rivalry between them making the comparison of special interest:

Counties.	1887. Gross tons.		1888. Gross tons.	
	Ingots.	Rails.	Ingots.	Rails.
Cook County, Ill.	531,054	439,345	373,106	302,722
Allegheny County, Pa.	518,094	287,363	451,127	154,882

It may be added, however, that the current year, with its comparatively full work thus far at the Edgar Thomson plant, and the addition of the Allegheny Bessemer on the one hand and the relative idleness of the Chicago mills on the other, is likely to reverse the figures in favor of Pittsburgh.

The production of open-hearth steel fell off slightly during 1888, the decline, however, taking place almost exclusively in the Western and Southern States, while Pennsylvania again forged ahead. The figures printed below show the production for a series of years:

Years.	New England, New York and New Jersey.	Pennsylvania.	Western and Southern States.	Total. Net tons.
1880.....	23,293	48,003	41,657	112,953
1881.....	29,600	63,363	53,983	146,946
1882.....	30,936	67,822	61,784	160,542
1883.....	30,904	69,353	43,442	143,699
1884.....	16,700	81,501	35,416	133,617
1885.....	18,263	94,506	36,229	149,098
1886.....	23,382	172,144	49,724	245,250
1887.....	18,442	270,710	71,565	360,717
1888.....	13,677	295,738	52,621	362,036

The enormous increase which has taken place in Pennsylvania since 1885 is probably due entirely to the use of natural gas as a fuel, which has led to the rapid development of open-hearth steel manufacture, notably in the Pittsburgh district. Since 1885, it will be observed, the make has trebled.

The production of bar, rod, bolt, hoop, skelp and shaped iron and rolled iron axles in 1888 amounted to 1,819,585 net tons, against 1,917,403 tons in 1887, a decrease of 97,818 tons, or 5 per cent. Pennsylvania made over 46 per cent. of the total production of these forms of iron in 1888, against nearly 48 per cent. in 1887; Ohio made nearly 19 per cent. in 1888, against 17 per cent. in 1887, 1886 and 1885.

The production of plate and sheet iron in 1888, excluding nail plate, amounted to 469,312 net tons, against 477,056 tons in 1887, a decrease of 7744 tons. Pennsylvania made 76 per cent. of the total production in 1888, against over 75 per cent. in 1887, and Ohio made nearly 13 per cent. in 1888, against over 11 per cent. in 1887.

Mr. Swank also gives the output of street rails, the quantity rolled in 1888 being 50,345 net tons, all of which, except 2000 or 3000 tons, were made of Bessemer steel. In 1887 the quantity rolled was 57,362 tons, while in 1886 the quantity produced was 48,009 tons.

It is stated that water gas is gaining in favor as a fuel for open-hearth furnaces in Germany and Austria. Hoerde has been running with water gas for some time, and at Witkowitz, Austria, it is also introduced. At the latter place the air is heated to from 1200° to 1400° Celsius, and yet the gas of combustion escaping from the regenerators carries only 400° to 500° Celsius. The furnace produces 20 tons of steel a day, the consumption of gas being 60 cubic meters per 100 kg. of steel, which is equivalent to about 400 pounds of coal per gross ton of ingots, or about 47 per cent. of the fuel consumption of the ordinary furnace fired with producer gas.

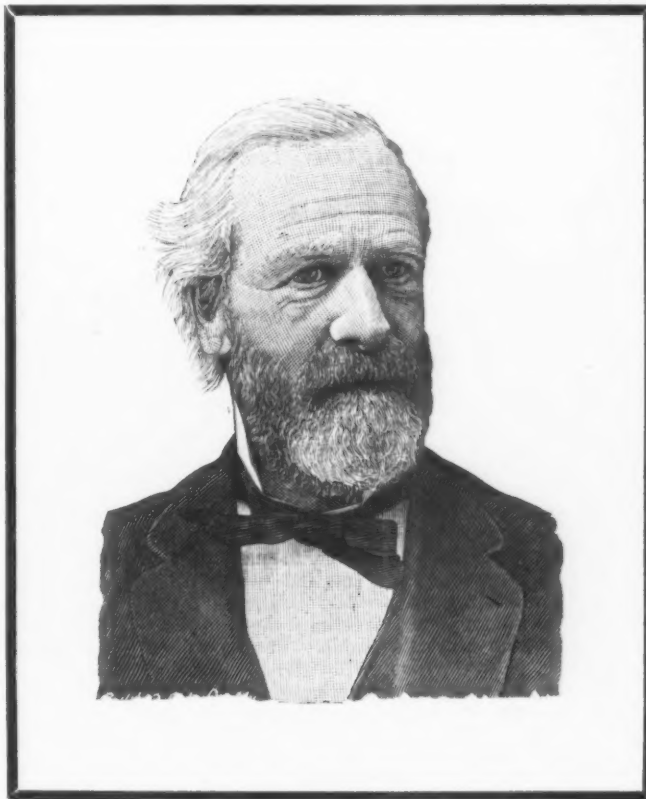
Edward P. Allis.

The death of Edward P. Allis, of Milwaukee, which occurred on the 1st inst., after a very brief illness, removes from the manufacturing interests of the Northwest one of their most prominent representatives. In his lifetime he had built up a small concern, known as the Reliance Works, with but a limited local business, into a vast establishment, employing 1500 workmen and sending its products all over the civilized world. He was a typical American, born and educated in the East, but entering the arena of business activity in the more promising West. He was born at Cazenovia, N. Y., on May 12, 1824, and was educated with a view to the practice of law, graduating from Union College, Schenectady, in 1845. Preferring an active business life to the professional career which had been mapped out for him, he located in Milwaukee in 1846, and opened a leather store in connection with William Allen, the style of the firm being Allis & Allen. They built a large tannery at Two Rivers, Wis., and conducted an extensive business, terminating their connection in 1854, when Mr. Allis sold out his interest in the firm and entered the real estate and brokerage business in connection with John P. McGregor. In 1860 those two gentlemen and Charles D. Nash concluded to purchase the Reliance Works, which had been established by Decker & Saville about 13 years previously, and consisted of a small stove foundry and machine-shop. The owners had failed in 1857, and the works were taken by the creditors and were being run under the management of S. S. Daggett when the transfer of proprietorship above noted was made.

The true business career of Edward P. Allis dates from the day when he became one of the owners of the Reliance Works. He had faith in their future, and did not hesitate to show it by his actions when his partners concluded to withdraw from the enterprise. He purchased their interests, became sole owner and assumed personal control and supervision of every detail of the establishment. In 1865 his business had so increased through his energetic efforts, indomitable perseverance and sagacious management that he was obliged to look for larger quarters, and the present site was selected for new works, being about a mile from the old location on West Water street. From year to year these works constantly expanded, until at the time of his death Mr. Allis stood at the helm of the largest manufacturing concern of its kind in the world, doing a machinery business of over \$3,000,000 per annum. The phenomenal development of these works is to be attributed solely to him. He called able lieutenants to assist him, but it was with the full knowledge that their special training and attainments were required in order to accomplish purposes which he himself had foreseen were essential. He was therefore one of those exceptional men endowed by nature with special facilities

for leadership. He knew how to manage other men. No employer ever had the welfare of his workmen more constantly in mind. He was at all times approachable and ready to listen to claims of right and justice or even ambition, recognizing and rewarding ability and rebuking favoritism. It can safely be asserted that no employer has held the warm admiration and loyal support of his workmen in greater measure than Mr. Allis.

Mr. Allis always occupied a prominent position in the social and business circles of Milwaukee, and his loss is keenly felt by that city. He was a fine scholar and a patron of art, having one of the choicest collections of paintings in the West. He took a lively interest in the questions of the day, and kept abreast of the scientific and mechanical developments of the age. He was quiet in his manner, simple in his



EDWARD P. ALLIS, OF MILWAUKEE, WIS.

Born May 12, 1824; Died April 1, 1889.

tastes and inclined to be reticent but positive in his convictions, and ready at all times to back up his opinions with cogent reasoning. In 1877 he was the Greenback candidate for Governor of Wisconsin, and lifted that party to a position of influence in State politics which was held for several years. In 1888 he returned to the Republican party, and took an active interest in the campaign, influenced by his belief in the policy of protection. The great works which were built up by Mr. Allis will continue their operations on the lines laid down by him and which have proved to be so successful. Several of his sons are interested in the establishment, and have already demonstrated their superior business qualifications.

Some idea of the violence of the storm through which the men-of-war were wrecked at Apia may be gained from the fact that the Calliope could only make half a knot an hour, although she is rated as a 15-knot ship.

The National Lead Trust.

Considerable interest is being taken in Wall street and in the metal trade in the movement of Lead-Trust stock. The name is hardly well chosen, since the company has only a moderate interest in pig lead, so far as product is concerned. Last year a company was formed, embracing a lead smelting works at Socorro, N. M., the refinery of the St. Louis Smelting and Refining Company and a number of St. Louis white lead works. At the time the movement attracted considerable attention, but was lost sight of subsequently. One by one a number of large white lead manufacturing plants in the United States were taken into the trust, a valuation being made of the plant and trust certificates to the extent of four times that valuation issued in payment therefor. It is estimated that from 50 to 60 per cent. of the white lead productive capacity of the country is now controlled by the trust, which then succeeded in inducing all the leading independent manufacturers, with the exception of one, in joining a pool based on the allotment plan in white lead. The result has been an advance in that commodity to a minimum of 6 cents a pound in the largest quantities and to an average of about 6½ cents on all sales. At the same time the advantage to the St. Louis refinery was the fact that it always had secured to it a market, a large proportion of the product being shipped to Eastern members of the trust. The refinery itself has developed its production in a very rapid manner, it being estimated that it is likely to produce this year close upon 30,000 tons of refined lead. It is urged in behalf of the trust that outside competition is not so readily developed in white lead, since a very large amount of working capital is needed and the introduction of a new brand of the pigment is difficult. Wall street has taken an interest in the matter since the report that capitalists identified with the Standard Oil Company have been heavy

buyers of Lead-Trust certificates for some time past; that the trust is making large quantities of money, and is likely to increase its earnings as soon as the present comparatively high-priced stock of raw material purchased before the break of last fall is worked up.

F. Valton reports in the *Génie Civil* that Alexander Pourcel has succeeded at the new basic open-hearth steel works of Bell Brothers, of which Sir I. Lowthian Bell is a member, in producing from Middlesborough pig carrying 1.7 per cent. of silicon and as much phosphorus, steel with as low as 0.03 per cent. of phosphorus. The lining of the furnace is chrome ore.

We understand that an official invitation has been sent by the Council of the American Institute of Mining Engineers to the British Iron and Steel Institute to hold the autumn meeting of 1890 in the United States.

The Tennessee Coal, Iron and Railroad Company.

The annual report of this, the largest coal and iron company in the South, for the fiscal year ending January 31, 1889, has been made for the meeting of the stockholders which was held on the 1st inst. The retiring president, Mr. Nathaniel Baxter, Jr., makes the following statement in regard to the production of the different departments of the company:

Division.	1887-88. Tons.	1888-89. Tons.
Tracy City, coal.....	426,274	413,631
Tracy City, coke.....	155,253	154,414
Cowan, pig iron.....	24,540	18,112
South Pittsburg, pig iron....	43,554	59,779
South Pittsburg, coal.....	15,206	53,609
South Pittsburg, coke.....	4,014	20,346
Birmingham, pig iron.....	41,556	47,770
Birmingham, coke.....	64,071	59,786
Pratt Mines, coal.....	718,824	888,247
Pratt Mines, coke.....	106,949	196,050
Ensley, pig iron.....	78,089	78,089
Inman Mines, iron ore.....	107,750	126,271

Total output.	1887-88. Tons.	1888-89. Tons.	Increase. Tons.
Coal.....	1,160,364	1,375,577	215,213
Coke.....	329,987	456,005	126,018
Pig iron.....	109,160	230,750	91,590
Iron ore.....	107,750	126,271	18,521

In order to provide working capital and yet not delay the completion of the Ensley furnace plant, the proposal was made to the stockholders to sell the company \$830,000 of stock at 30 cents, and to buy \$1,000,000 from the company, at 90 cents, of stock having a cumulative 8 per cent. preference dividend attached to it. This operation was carried out, netting \$642,157.72, after deducting the expenses incident to issue, sale and listing. The common stock of \$9,000,000 is held by 259 persons, while 92 are on the books as holders of the \$1,000,000 8 per cent. preference stock. The fixed charges, according to the statement of Jas. Bowron, secretary and treasurer, are \$420,050, including 6 per cent. on \$5,156,200; 7 per cent. on \$1,015,000, of which \$6,007,800 are in circulation. The sinking funds call for 1 per cent. on \$3,640,000 and 1½ per cent. on \$1,279,200. There is to be deducted 6 per cent. on \$236,000 held by the trust company for exchange. This makes the total fixed charges payable \$420,050, of which \$343,557.29 are chargeable to profit and loss, leaving \$76,492.70 available for reduction of the bonded debt in 1889. In October, 1886, the company entered upon a scheme of enlargement and development, to which there was a total disbursement of \$2,154,234.86, the totals being as follows:

	Oct. 1, 1886, to Jan. 31, 1888.	Feb. 1, 1888, to Jan. 31, 1889.	Total.
At the Ensley division.....	\$677,631.39	\$421,255.54	\$1,098,886.93
At the Pratt Mines div.....	409,357.39	172,745.76	672,103.15
At the South Pittsburg division.....	200,107.56	41,348.99	331,456.55
At the Bir- mingham division.....	Cred 69.43	3,110.05	3,040.62
At the Tracy City div.....	7,356.90	.....	7,356.90
Ch'd through Nashville books.....	42,422.42	Cred. 831.71	41,590.71
Totals.....	1,516,906.23	637,628.63	2,154,434.86
Less credits at Cowan div.....	.....	200.00	200.00
Final totals	1,516,906.23	637,428.63	2,154,334.86

The undivided balance brought forward from the preceding year was \$404,747.38. The aggregate profits from the year's business and the sale of preferred stock amounted to \$1,223,250.14, a total of \$1,627,997.52. After paying interest ag-

gregating \$336,696.98 and a dividend of \$40,000 on the preferred stock, a balance remained to credit of profit and loss of \$1,251,300.55. In detail the profits of the fiscal year on the different divisions were:

Tracy City division.....	\$127,878.12
Cowan division.....	7,174.23
South Pittsburg division.....	27,641.38
Birmingham division.....	76,381.58
Pratt Mines division.....	213,288.76
Ensley division.....	213,728.35
	\$666,002.42

The Pratt Mines division shows the heaviest profit on the coal account of \$170,738.33, while the principal profit on the Ensley division is, of course, on pig iron, of \$202,851.23 on a product of 78,089 tons. The Birmingham division shows a profit of \$75,282.91 on 79,786 tons of pig iron, while at the Cowan division, where the product was 18,112 tons, the profit on pig iron was \$2659.24. South Pittsburg, with an output of 56,779 tons of pig iron, is credited with \$13,563.70 profit thereon. The Tracy City division, including the Inman Mines and the Tracy City coke furnace, is credited with \$83,583.47 on an output of 126,271 tons of ore, and \$29,972.02 on 154,414 tons of coke.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., April 16, 1889.

The ordnance officers are determined not to lose any grounds for a thorough test of the adaptability of cast-steel guns to warlike work. The Thurlow gun, which met with better success in the firing test than the Pittsburgh gun, having gone through with the first requirements, both firing and gauge, is now charged with showing signs of scaling in the bore, which was discovered upon regauging. The friends of the gun claim that this is the result of some defect in the casting, and does not impair the strength of the gun. It is proposed, however, to subject it to a more severe firing test than would be required in actual service. If the gun bursts it will doubtless be claimed that the whole system is impracticable. The officers are evidently determined to give the theory of cast-steel guns a severity of experimental strain which, if overcome, will not only place this class of guns in high favor, but will simplify and cheapen gun construction.

Secretary Windom has determined upon a practical solution of the tariff question. It is his intention, as soon as the personnel of the customs service has been organized, to place in the hands of the collectors of customs at certain leading importing cities of the country a copy of the Senate tariff bill, with instructions to apply its provisions to the customs service in actual practice. The Secretary says that the tariff question has now been one of long agitation, and unless settled in some practical way will continue for an indefinite time to agitate and disturb the industries of the country. It is his purpose to give particular attention to the workings of the schedules of metals, wool and woollens, silks and cotton fabrics. The metal provisions of the Senate tariff bill are very elaborate. This schedule, under which there has been so much appeal and litigation, will be put to a thorough trial.

The Secretary has not determined whether he will make the results of this inquiry the basis of a special report on tariff revision in his own communication to Congress, or whether a bill will be formulated and submitted to the Administration leaders of the House for introduction and reference to the Committee on Ways and Means. The prominent Republicans who are in the city, and particularly Senator Allison, who had charge of the Senate bill, think that the Secretary's plan is an

excellent one, and will co-operate with him in his effort to solve the tariff problem. The Secretary, as every one knows, is a strong Protectionist. He believes in fostering the tin-plate, wire and wire-rod and cotton-tie industries, and various other branches of metallurgical interests, to the utmost extent of sagacious legislation.

Captain Howison, president of the Steel Inspection Board, is engaged in preparing schedules and instruction for the corps of inspectors of material which will be used in construction of the additional vessels of the navy authorized by Congress. The meeting of the president of the Inspection Board, the chief constructor, engineer-in-chief and representatives of the manufacturers, while it afforded an opportunity for an exchange of ideas, resulted in no change of plans as contemplated. It was found that the inspections of boiler plates and material for use in the ships at the navy-yards would not answer the purpose. The manufacturers were unwilling to assume the responsibility. They preferred to have a representative of the Government inspect the materials and progress of manufacture and the results at the works before the material was subjected to the additional expense of transportation. The duty of an inspector is very severe. It has been the subject of complaint by officers, which led to the attempt of the Secretary to change the method of inspection. The officers are required to examine the material when being prepared, to see it placed in the furnaces, to watch its treatment, to see it run into ingots and to follow every subsequent stage in order to have a complete record of the physical properties and chemical attributes of the product. In the indorsement on the report of the board, the Secretary authorized the continuance of inspections under the old rules.

Captain Howison says that the report of the results of test is not entirely completed, but when it is it will show the wonderful strides made by the steel producers of the United States since the system of inspection was inaugurated. The inspection of material for the new ships was never in a more efficient condition, and results are being achieved which in the beginning were regarded as impracticable.

Naval constructors, engineers and ordnance officers are anticipating with marked interest the completion of the Herreshoff torpedo-boat which is being constructed for the Navy Department. If the claims of the constructors are realized this small craft will be one of the most destructive engines of naval warfare afloat, and with the dynamite cruiser will place the American navy in possession of two methods of offense which will not be exceeded by any navy in the world. The boat is 137 feet long, 14½ feet beam and 8 feet depth of hold. She will have a secondary battery of two 6-pounders, machine guns, and not less than 20 knots per hour speed. Her boilers and engines possess great power. The vessel is constructed in eight watertight compartments. The torpedo shutters on either side of the boat are so placed as to be protected by the turtle-back of the forward part of the boat. The contract price is about \$83,000, and a bonus of \$1500 extra for each quarter knot made in excess of 23 knots. It is expected that the trial of this diminutive but formidable craft will take place in about a month. Naval officers, who are waiting for the debut of the craft with great interest, will send a large representation to witness her performance in Newport waters when the trial takes place.

The Dominion Customs Department has decided that the rate of duty on sheet brass, plain, stamped or figured, cut into narrow strips, shall be 30 per cent. ad valorem.

The English Compound Locomotive.

Some time since the Pennsylvania Railroad Company brought from England a duplicate of one of the engines which had made such remarkable runs on the London and Northwestern road. The engine was assembled at the Altoona shops and is now being tested. In order that the test of the engine should be as favorable as possible an engineer familiar with its construction and operation was brought from the other side and placed in charge. The new locomotive is a compound, has two high-pressure cylinders placed outside and one low-pressure inside. The two pairs of driving-wheels are unconnected, and are driven, one from the high-pressure and the other from the low-pressure cylinder. The two high-pressure cylinders receive steam direct from the boiler, use it expansively and drive the two trailing wheels. From there the steam passes to the low-pressure cylinder, which is placed under and behind the smoke-box. Here it again expands and drives the forward pair of wheels. The steam then escapes through the smoke-stack. The engine weighs, when in working order, 95,200 pounds, the tender, when empty, weighing 27,000 pounds. The driving-wheels are 6 feet 3 inches in diameter. The high-pressure cylinders are 14 by 24 inches, and the low-pressure 30 by 24 inches. The low-pressure cylinder slide-valve is placed above the cylinder, while in the high-pressure cylinders the steam-chests are beneath them, this construction being adopted to allow the valves to drop off the face of the chest when the engine is running but not using steam.

An interesting account of a ride on this engine is given by a representative of the *Railroad Gazette*, who notes some of the peculiarities of the engine as compared with the American type. We quote as follows:

At starting the rear drivers are allowed to slip a few turns until the low-pressure cylinder has a supply of steam at a pressure of 40 pounds, as shown at the gauge connected with the receiver. The valve motion regulating the steam admission to the low-pressure cylinder is almost always run at full gear. This gear is operated by a separate reverse lever not unlike our own type. The valve gear for the high-pressure cylinder is operated by means of a screw and wheel with a handle attached, as the custom is on English locomotives. The location of the cut-off point is shown by an index finger on the screw itself. Soon after starting the initial pressure in the large cylinder drops to 30 pounds. At this time the locomotive is exerting sufficient power to slip all of the wheels. The weight upon drivers being about 65,000 pounds, the pull upon the draw-bar must be considerable. One of the most noteworthy features of the action of this engine, and one which should give us all "food for reflection," is the action of the fire under the infrequent blasts from the exhaust nozzles. The number of blasts in a given time is just one-half of those from the common locomotive having the same size of drivers and running at the same speed. The reason of this is that there is only one low-pressure cylinder. With these infrequent blasts, and with a low force of blast scarcely audible in the cab, the fire burned brightly and supplied sufficient steam for the locomotive to exert its full power on the very steep grades at that part of the line between Altoona and Gallitzin before and after reaching the "Horseshoe Bend." This locomotive is fitted with a re-entering fire-door, and the very small amount of smoke issuing from the top of the stack showed the advantage of admitting air to the fire-box above the fire and deflecting it downward upon the bed of incandes-

cent coal. While passing around curves the engine showed no more tendency to "grind" or bind upon the track than the average American locomotive, but one could see she had been designed for very smooth roads; this was evident from the shortness of the springs and the consequent "rough riding" when passing over the proverbially good track of the Pennsylvania. The tender is a model of economical design, and presents to the mechanical department of our American railroads a design which is easily repaired, readily accessible at all times, and one which will pass curves readily and ride like a passenger car. While we do not believe that this locomotive as a whole, or in any large collection of its parts, will be adopted by American railroads as a standard design, we do think that the study of the elements of her design will lead to new inventions and prevent our own mechanics from falling into grooves of opinion, which is the way of all mankind when left to its own admiration.

The financial column of the Boston *Herald* contained the following recently: "The name of the new rolling mill to be formed by the union of the North Chicago Rolling Mill Company, the Joliet Steel Company and the Union Steel Company is the Illinois Steel Company. It is to have 11 directors, and the surplus of the various companies is to be capitalized, the total capital to be \$25,000,000. The value of the present plants, the cash surplus and new stock are thus tabulated in the official circular:

	Value of plant.	Cash surplus.	New stock.
North Chicago ..	\$7,000,000	\$2,000,000	\$9,000,000
Joliet	3,000,000	900,000	3,900,000
Union	2,750,000	800,000	3,550,000
Total	\$12,750,000	\$3,700,000	\$16,450,000

The Union Company have \$1,200,000 bonds out, which are to be converted into stock, and have a valuable coking plant in the Connellsville, Pa., region, which is to be purchased for say \$1,250,000 cash or stock, making the issued capital \$18,900,000, and leaving \$6,100,000 stock in the treasury. The above is the outline of the plan, which is subject to modification. The North Chicago stockholders will probably get one and one-half new shares for one present share."

One of the largest, if not the largest, wire ropes ever made for use in this country, says the *Engineer* of the 5th, was last week dispatched from the works of Dixon & Corbitt and R. S. Newall & Co., of the Teams, Gateshead. Its length is 4560 yards, and its circumference 5 inches. It weighs over 23 tons, and occupied three large railway trucks. The rope has been made for the North British Railway Company, and is to be used for drawing the trains from their Queen street station, Glasgow, to Cowairs. A wire rope has been used for this purpose some years, but this is the first one made on Lang's patent. This make of rope has been proved to be superior to any other for haulage and incline work, and we have no doubt will do credit to the makers. We understand that this firm, with a view to extend their business in the South Wales coal field, have recently established a manufacturing branch at the Windsor Rope Works, Cardiff.

A few days since dispatches from Troy announced the success of an experiment carried through at the works of the Troy Steel and Iron Company in making soft steel under a process invented by C. W. Bildt, chief chemist of the Washburn & Moen Mfg. Company, of Worcester, Mass. We learn that Mr. Bildt's process consists in a modification of the Bessemer, a special lining being used. He experimented with it some time since at Wheeling, W. Va., and, we understand, showed results fa-

vorable enough to impress Washburn & Moen with the value of the method. Not having a plant of their own, they arranged with the Troy Steel and Iron Company for carrying out experiments, upon the outcome of which was dependent a contract for a large quantity of billets. So far as we are advised, the matter has not yet progressed to a point where it is settled.

America's Oil Supply.

An article published in the Oil City *Derrick* recently contains some statements regarding the area and character of the illuminating oil-bearing territory which should be reassuring to believers in a possible future oil famine in this country. The oil regions as now developed, the article states, "extend from Wellsville, N. Y., crossing Pennsylvania at nearly a 45° line to Dunkard Creek, in West Virginia. On an air-line this covers a distance of 204 miles in length, and, so far as developed, the belt is about 10 miles in width. The yield of the oil fields up to March 1, 1889, was 340,133,997 barrels. About 150,000,000 barrels of this came from McKean County alone, and this county is still good for 20,000 barrels a day." The total future production of this belt is beyond prediction. It has been noted, says the article, that oil-bearing rock, wherever found, usually yields about the same quantity of oil to a given acre. The yield of oil per square mile of territory during the first 15 years of its existence is about 1,000,000 barrels. It is considered certain, however, that each of the 204 square miles of territory will not yield this quantity. If it did the total production there outlined would be about 2,040,000,000 barrels. "This belt of 204 miles is a chain of pools, large and small, and until the area of each one is known the total yield would be simply conjecture."

The figures and estimates given relate only to the region where the illuminating oil of commerce is produced, namely, New York, Pennsylvania and the Mackaburg district, in Ohio. The great Lima field is not taken into account, nor Colorado, California, Kentucky or Tennessee. "It has been stated that under the drill the Ohio field might be made to yield 100,000 barrels a day. This is not improbable, since the Bradford field in July, 1882, produced 105,102 barrels each day of that month. The Bradford field had no large wells compared with the geysers of Ohio. Lima oil is worth but about one-seventh as much as the Pennsylvania product, and can never come into competition with it as an illuminant, unless some new process of manufacture is discovered beyond anything now known. Its utility in the world's economy lies in the direction of fuel, and there is not much likelihood that it will ever be diverted from this field. Natural gas is the only fuel that can compete with it in cheapness, and that is not everywhere obtainable. Natural gas cannot be transported much above 100 miles, and oil fuel may be carried to the ends of the earth. As far west as Omaha it is now furnishing manufacturers a cheaper fuel than coal." With the above large supplies of oil, both for illuminating purposes and for fuel, in sight, the writer of the article apparently sees little reason to fear an oil famine, as he states it, as among the immediate probabilities.

It is stated that the annual report of the Crane Iron Company for the last fiscal year showed that on a product of 75,000 tons of pig iron the gross earnings were about \$81,500, while the net earnings were a trifle under \$25,000. It should be stated, however, that a coal strike early in the year 1888 reduced the earnings of the company by about \$30,000.

THE FREIGHT AGITATION.

FINISHED IRON IN WESTERN PENNSYLVANIA.

Pittsburgh manufacturers are discussing eagerly the question of freight discrimination, and a movement is on foot to thoroughly organize. We have been favored with some data which will aid in a correct estimation of the rates paid on finished iron for various distances. We compile from them the following table:

Pittsburgh Rates on Finished Iron.

Miles.	Rate.	Per ton per mile.
100.....	\$8.06	8.60
150.....	1.79	1.19
257.....	2.01	0.78
320.....	2.91	0.91
354.....	2.91	0.82
444.....	3.36	0.76
468.....	3.36	0.72
621.....	4.14	0.67

RATES ON SOUTHERN FINISHED IRON.

A leading manufacturer in the Birmingham, Ala., district sends us the following communication:

Judging from the reiterated statements of Carnegie and the numerous articles in the iron papers in reference to the rates of freight, the uninitiated would undoubtedly conclude that the Southern industries were carefully huddled under the protective wing of the railroads of this section, and that the railroads in the North were pursuing a cutthroat policy by taxing the industries with excessively high rates of freight. With the view of correcting this erroneous impression I have compiled some data, which I hand you herewith for publication, presuming that you will extend the courtesy of your columns in your usual impartial manner. In all our experience, during nine years, we have found that to competitive points we had to pay a higher rate per ton per mile than our Northern competitors, and for several years we have been making efforts to have a just equalization.

Birmingham, Ala., Rates.

Miles.	Rate gross ton.	Per ton per mile. Cents.
24.....	\$2.24	9.33
33.....	2.24	6.79
55.....	2.24	4.07
87.....	6.04	6.93
96.....	2.10	2.19
143.....	2.24	1.56
276.....	2.46	0.89
348.....	3.02	0.87

These figures certainly show that for hauls in their own particular territory the Southern railroads develop in the most orthodox manner the principle of taking all which the traffic will bear. The rates up to 150 miles are undoubtedly outrageous.

Our correspondent draws an interesting comparison between the Pittsburgh, Youngstown and Birmingham rates to Chicago, Kansas City, San Francisco and Los Angeles, Cal., which we reproduce:

	Pittsburgh.		Youngstown.		Birmingham.	
	Miles.	Rate gross ton.	Miles.	Rate gross ton.	Miles.	Rate gross ton.
Chic..	468	\$3.40 0.73	423	\$2.91 0.60	649	\$5.38 0.83
K. C....	808	7.84 0.87	892	8.06 0.90	738	7.50 1.02
S. F....	3041	25.76 0.85	2966	25.76 0.86	2843	25.76 0.91
L. A....	2701	25.76 0.94	2656	25.76 0.96	2361	25.76 1.00

Nor is our correspondent content with allowing the impression to prevail that the rates on raw material to rolling mills in the Birmingham district are low. We quote the following figures on coal, ore and pig metal; all of them, it will be observed, are short hauls:

	Coal.	Per ton per mile. Cents.
Miles.	Rate gross ton.	
8.....	\$0.28	3.11
9.....	0.28	3.50
15.....	0.28	1.87

Ore.		
7.....	\$0.25	3.57
14.....	0.25	1.78
Pig Iron.		
6.....	\$0.28	4.66
7.....	0.28	4.00

The following comparisons are made, too, to show that the differences in the rates on pig iron are not so great as claimed, the Shenango Valley and Birmingham being placed side by side:

Comparative Rates on Pig Iron.

	Shenango Valley.			Birmingham.		
	Miles.	Rate gross ton.	Per ton per mile. Cents.	Miles.	Rate gross ton.	Per ton per mile. Cents.
Chicago....	475	\$2.20	\$0.46	649	\$3.95	\$0.61
Evansville.	550	2.50	.45	362	2.71	.75
Indianapolis.	381	1.80	.44	504	3.21	.63
Green Castle.....	419	2.20	.52	537	3.70	.69
East St. Louis..	506	2.50	.41	525	3.21	.61

RATES IN WESTERN PENNSYLVANIA AND OHIO.

Since the last issue of *The Iron Age* we have gathered additional figures. One of the most interesting documents in question dealing with short hauls is the Special Freight Tariff No. 124, issued by the Pennsylvania Company, which went into effect on January 14 of this year, covering shipments of pig iron, blooms, billets, muck bar, scrap iron and steel, skelp, native ore, cinder, scale, coal and coke in carloads between all stations Rochester to Leontonia, Newcastle to Shenango, all stations on the N. C. and B. V. R. R. all on the P. Y. and A. Ry. The rates in question are:

Distance.	Pig iron, billets, muck, scrap, skelp.	Native ore, scale and cinder.	Coal.	Coke.
	Per gross ton.	Per gross ton.	Per net ton.	Per net ton.
Under 10 miles.....	Cts. 25	Cts. 25	Cts. 30	Cts. 30
10 and under 15 miles.....	30	30	30	35
15 and under 20 miles.....	35	35	35	40
20 and under 25 miles.....	40	40	35	50
25 and under 30 miles.....	45	40	35	50
30 and under 35 miles.....	50	40	40	55
35 and under 40 miles.....	55	45	40	55
40 and under 45 miles.....	60	45	45	60
45 and under 50 miles.....	65	70	50	60
50 and under 75 miles.....	80	70	60	65

In the last issue of *The Iron Age* we printed figures bearing chiefly on a short haul on pig iron. Below we give data relating to rates on greater distances east and west for the Mahoning and Shenango valleys.

Rates on Pig Iron, Mahoning and Shenango Valleys.

Distance. Miles.	Rate gross ton.	Per ton per mile. Cents.
175.....	\$1.20	0.68
183.....	1.85	0.07
251.....	1.95	0.77
260.....	1.60	0.62
265.....	1.95	0.73
295.....	2.20	0.74
322.....	45	0.74
353.....	45	0.80
390.....	50	0.70
398.....	70	0.68
405.....	20	0.54
412.....	70	0.66
415.....	90	0.70
448.....	3.10	0.69
478.....	2.70	0.56
530.....	3.20	0.60
600.....	2.50	0.41
622.....	3.50	0.56
681.....	4.30	0.63
700.....	4.20	0.60
800.....	4.30	0.54

On distances of over 250 miles the rate therefore ranges within wide limits between 0.41 and 0.77 cent per ton per mile.

On partly-finished articles, like muck bar, wire rods, billets and blooms, we compile the following rates for Western Pennsylvania:

Rates on Muck Bar, Billets, Wire Rods, &c.

Distance. Miles.	Rate gross ton.	Per ton per mile. Cents.
8.....	\$0.40	5.00
40.....	.91	2.27
46.....	.80	1.74
66.....	.95	1.44
157.....	2.91	1.85
160.....	1.68	1.05
172.....	2.24	1.30
224.....	2.50	1.18
282.....	2.64	1.10
340.....	2.64	1.01
640.....	4.92	0.77
680.....	5.15	0.76

Here, too, the hauls for moderate distances between 50 and 200 miles are altogether too high, and should be very materially reduced.

It is interesting to compare these data with the rates paid on different hauls on pig iron east of the Allegheny Mountains by manufacturers in that section. We give the figures below:

Rates on Pig Iron in the East.

Distance. Miles.	Rate. gross ton.	Per ton per mile. Cents.
5.....	\$0.30	6.00
8.....	.45	5.60
12.....	.35	2.91
14.....	.45	3.21
15.....	.50	3.33
16.....	.45	2.81
20.....	.50	2.50
42.....	.50	1.19
49.....	.60	1.23
58.....	.75	1.28
65.....	.90	1.38
69.....	.60	0.87
74.....	.60	0.81
85.....	1.35	1.59
86.....	.85	0.96
88.....	.90	0.97
105.....	2.24	2.15
100.....	.75	0.75
100.....	.90	0.90
110.....	1.17	1.06
112.....	1.25	1.11
120.....	2.00	1.59
130.....	2.00	1.47
140.....	1.40	1.00
151.....	2.00	1.32
164.....	1.30	0.73
190.....	2.00	1.05
216.....	1.30	0.56
234.....	2.00	0.85
262.....	2.86	1.00
305.....	1.50	0.41

It is only too evident from this table that there are amazing irregularities in the freight rates paid on pig iron, and that with a very few exceptions they are disproportionately high. It is clear that whatever may be the grievances of the manufacturers in other sections, the producers of Eastern Pennsylvania have more to complain of. On short hauls on ore and coal very heavy tolls are exacted. Looking over the whole field, and we have only gone over part of it, there is crying need for reform. The spirit with which manufacturers in different parts of the country have been met by railroad managers has been exasperating in the highest degree. At a recent conference held in Pittsburgh an official high in power in the Pennsylvania Company took the ground that if the pig-iron producers could not pay existing rates of freight they had better close down their furnaces until they could. Again and again have railroad managers appeared incapable of understanding that they must afford relief or lose a very large traffic. They seem to cling to the notion that because work has continued thus far it will go on indefinitely; that the freight carried for iron-makers is particularly suitable to compensate for money thrown away in wild competition on long hauls of other goods by burdening upon it high locals. A radical change is necessary in the method, or rather the lack of method, pursued by railroad managers. Broader, fairer views must prevail or all interests must suffer.

Thomas M. Jones, of the firm of Jones & Laughlins, and brother of B. F. Jones, died on Saturday last, aged about 60.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., April 16, 1889.

Pig Iron.—The market does not show much rallying power, although there is a general feeling that prices cannot possibly recede below their present level. There is a great deal of hesitancy nevertheless; partly because of the shutting down of mills here and there, and partly because of unfavorable advices from the West and South. The outlook is very much mixed, making it almost impossible to form any definite idea of what the next turn in the market will be, or when it will be. Developments of an unfavorable character would certainly be met with a decided curtailment of output, which of course would lead to a stiffening in prices, but in spite of that, the market continues feverish, unsettled and if not weak, it is surely far from being strong. A great deal will depend on the outcome of events during the next 30 days. There must either be an increased demand, or a decreased production—not that there is any serious overproduction, but there are too many that are trying to sell for forward delivery. That is, bids are being solicited, although it is by no means certain that they would be accepted to anything like the extent that might be inferred from the urgency with which offers are sought for. This of course has reference more particularly to outside Irons. Standard qualities hold their position very fairly, but anything new or at all doubtful as to quality is hard to place, unless concessions of more or less importance are submitted to, and unfortunately this class of Iron seems to exercise a considerable influence at present. There is a great deal in the general outlook that is very encouraging, but as yet it is all in the future, while for the time being things are about as dull as they have been at any time during the year. Prices remain about as quoted last week—viz., \$17.50 @ \$18.50 for good to choice Pennsylvania brands of No. 1; \$16.50 @ \$17 for No. 2, and \$15 @ \$15.50 for Gray Forge. Southern Irons are offered delivered in consumers' yards at \$14.75 for Gray Forge, \$16 @ \$16.50 for No. 2, and \$17 for No. 1, but there is very little doing, except in low grades, at prices which are not made public.

Blooms.—The market is dull, but there is something doing all the time at about the figures quoted as follows: \$28 @ \$28.50, at mill, for Nail Slabs; \$29 @ \$30 for Sheet-Iron Billets; \$30 @ \$31 for Soft Tank, and \$35 @ \$36 for Flange purposes; Charcoal Blooms, \$52 @ \$54; Run-out Anthracite, \$41 @ \$42.50; Scrap Blooms, \$32 @ \$33 1/2 "Bloom" ton of 2464 lb.

Muck Bars.—There is less disposition to quote prices, except for immediate delivery. Sellers ask \$27 delivered, and it would be difficult to secure fair-sized lots for less, providing that quality was all right. There are buyers at \$26.50, but no sales of any amount have been made recently.

Bar Iron.—Business remains in a most unsatisfactory condition, and, if changed at all since last week, it is not for the better. The absence of orders from large consumers is specially noticeable, so that there is quite a probability of some leading mills being shut down until business improves. There is something doing, of course, but not nearly sufficient to keep the mills running on a paying basis. Prospects are not encouraging either, and, while every one feels that the present condition of affairs cannot last much longer, manu-

facturers are getting tired of waiting and talk seriously of shutting down, rather than pile up stock for an uncertain market. The demand for Skelp Iron has also dwindled away to a mere nothing, so that, from whatever point of view the position is regarded, it is unsatisfactory. Prices, therefore, are greatly demoralized and hardly quotable except in a general way at from 1.75¢ to 1.80¢, subject to all sorts of concessions, according to circumstances.

Plate and Tank Material.—In this department there is a perceptible improvement. The leading mills are nearly all full for the next three or four weeks, while the number of inquiries denote continued activity. Prices are still down at the lowest for years—probably the lowest on record—but another couple of weeks' business like the last two would certainly lead to an advance. In fact it would be difficult, if not impossible, to duplicate some of the recent purchases, as sellers feel that prices are entirely too low. Quotations, therefore, are nominally unchanged, and for small lots are about as follows: 1.90¢ @ 2¢ for Ordinary Plates and Tank Plates; 2.1¢ @ 2.2¢ for Universal Plates; Shell, 2.4¢ @ 2.5¢; Flange, 3.3¢ @ 3.4¢; Fire-Box, 3.5¢ @ 3.7¢; Steel Plates, Tank and Ship Plate, 2.1¢ @ 2.25¢; Shell, 2.7¢; Flange, 3¢ @ 3 1/4¢; Fire-Box, 3 1/4¢ @ 3 1/2¢.

Structural Material.—There is more doing in this department, and a better feeling prevails both as regards the present and the future. Specifications on old contracts are coming in quite freely, while the amount of work in prospect is very encouraging. Prices remain at a low point owing to the large productive capacity and to the eagerness with which their new business is competed for. Still, things are undoubtedly improving, and a little further on it is hoped that prices will begin to sympathize. Meanwhile quotations are nominally as follows: Bridge Plate, 2¢ @ 2.1¢; Angles, 1.95¢ @ 2.05¢; Tees, 2.4¢ @ 2.6¢; Beams and Channels, 2.8¢ for Iron or Steel.

Sheet Iron.—There is a fair demand, and mills are running full without accumulating much stock. Prospects for the spring trade are thought to be favorable, and the following schedule of prices is well maintained:

Best Refined, Nos. 14 to 20.....	3¢
Best Refined, Nos. 21 to 24.....	3.20¢
Best Refined, Nos. 25 to 26.....	3.40¢
Best Refined, No. 27.....	3.50¢
Best Refined No. 28.....	3.60¢
Common, 1/4¢ less than the above.	
Best Soft Steel, Nos. 14 to 20.....	3 1/4¢
Best Soft Steel, Nos. 21 to 24.....	3 1/2¢
Best Soft Steel, Nos. 25 to 26.....	3 3/4¢
Best Soft Steel, No. 27.....	4¢
Best Bloom Sheets, 1/4¢ extra over the above prices.	
Best Bloom, Galvanized, discount.....	.65 %
Common, discount.....	.67 1/2 %

Steel Rails.—The market is a mystery, considering the general surroundings. Prices are now within about a couple of dollars per ton of those quoted in foreign markets, and yet there are no indications of our markets moving in sympathy. Inquiries are about as usual, but the amount of business taken from week to week is very disappointing. Prices are nominally \$27.50 @ \$28, at mill, but it is not unlikely that these figures are being shaded, although in this market buyers admit that they find prices very firm.

Old Rails.—Business remains in a most uninteresting condition, with nothing whatever doing in this market. Small lots are wanted at about \$24 @ \$24.25, delivered to consumers in the interior, but there are very few that can be worked in at those figures. Lots for shipment are offered at \$23.50, with buyers at \$22.50.

Scrap Iron.—The offerings are light, so that prices are maintained at the figures recently quoted, with a fair inquiry for

lots delivered at outside points. Quotations nominally as follows: \$20 @ \$21 for cargo lots; \$21 @ \$21.50 for carload lots, delivered, or for choice, \$22; No. 2 do., \$14 @ \$15; Turnings, \$14 @ \$15; Old Steel Rails, \$18 @ \$19; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish Plates, \$23 @ \$24; Old Car-Wheels, \$17 @ \$18, Philadelphia.

Wrought-Iron Pipe.—There is a good demand, and with prospects of continued activity, prices are steady at the following discounts: Butt-Welded Black, 55%; Lap-Welded Black, 65%; Butt-Welded Galvanized, 45%; Lap-Welded Galvanized, 55%; Boiler Tubes, 62 1/2 %.

Nails.—There is no improvement to notice in this department. It is rumored that the attempt to form an agreement to restrict production has been abandoned, but as about one-third of the mills are idle, stocks are greatly reduced. Prices, however, are demoralized, and for carload lots are quoted all the way from \$1.80 to \$1.85, according to brand. Lots from store of good quality, are held at \$1.90 @ \$2, with a somewhat increasing demand.

Chicago.

Office of *The Iron Age*, 95 and 97 Washing-
ton street, CHICAGO, April 15, 1889.

A very quiet week has been experienced in nearly every branch of the Iron trade. The paucity of sales has not been for lack of drumming, but consumers seem to be well supplied for the present and concessions on former prices do not tempt them, especially when the demand for their own productions seems to be declining. The remaining half of the month of April promises to be even quieter than was the first half.

Pig Iron.—Transactions have been quite limited since our last report. Sellers of Southern Coke Iron are holding on to this market with grim determination in competition with local Iron, and occasionally capture an order. They seem to have better success in this respect than the representatives of Ohio furnaces. Outside of the Blackbands but a very small quantity of Ohio Iron is now able to reach the yards of Chicago consumers. The demand for Strong Neutral Foundry Pig is growing on the Pacific Coast, and inquiries are being received from that market by Ohio furnacemen. Lake Superior Charcoal is slightly weaker, a low sale of a small lot under special circumstances being used as a lever to depress prices. Cash quotations are as follows, f.o.b. Chicago: Local Coke Iron, No. 1, \$16 @ \$16.50; No. 2, \$15 @ \$15.50; No. 3, \$14 @ \$14.50; Chicago Scotch, \$17 @ \$17.50; Bay View Scotch, \$16.50 @ \$17; Lake Superior Charcoal, all numbers, \$19 @ \$19.50; American Scotch (Blackband), No. 1, \$18.50 @ \$19; Southern Coke, No. 1 Foundry, \$16 @ \$16.25; No. 2 Foundry and No. 1 Soft, \$15.50 @ \$15.75; No. 3 Foundry, \$15 @ \$15.25; Gray Forge and No. 2 Soft, \$14.50; Tennessee Charcoal, No. 1, \$19; No. 2, \$18.

Bar Iron.—A little more movement has occurred in the direction of Car Iron, but competition for this business is sharp. None of these orders are very large, however, the most important covering the requirements for but 600 cars. In other channels of consumption business has not been heavy, and prices are barely sustained. Quotations on carload lots of Common Iron from mill still range from 1.60¢ to 1.65¢, half extras, f.o.b. Chicago, with concessions on large orders. Store trade is quite brisk at 1.80¢ @ 2¢, according to quantity and quality.

Structural Iron.—There is a continued active demand for Beams in small quantities, but other shapes are quiet. Prices are as last reported.

Plates, Tubes, &c.—The boiler-makers are running out of work, and are consequently buying less material, which causes quite a shrinkage in the volume of business. Plate manufacturers are soliciting orders with increased vigor, but they are getting little encouragement in this market. Prices are unchanged.

Sheet Iron.—Nothing of special importance has occurred in Black Sheets, mill lots of No. 27 Common for early delivery being quoted at 2.95¢ @ 2.95¢ f.o.b. Chicago, and small lots from store at 3.10¢ @ 3.20¢, with light sales. Some large buyers of Light Sheets, fearing a dispute over wages may cause mills to shut down during the summer, have placed orders for delivery in the latter part of June at 2.85¢, at mill, for No. 27. Galvanized Iron has subsided from its recent active movement into a state of decided dullness, and manufacturers' agents are anxiously looking for orders, with the usual effect of weakening prices. Small lots of Juniata are quoted at 65 % off and Charcoal at 65 % and 2½ % off.

Merchant Steel.—Store trade is excellent, but large orders are not looked for until after the 1st of May. Prices continue about the same as previously quoted, an occasional cut being made by manufacturers anxious to get a greater share of current business. The makers of syndicate Steel reduced prices on the 4th inst. ½¢ @ 1½ on Moldboards, Landsides and Shovel Blades, and ¼¢ on Shares and Slabs, the schedule now being as follows, f.o.b. Pittsburgh, four months, or 3 % off in 30 days, subject to a rebate of ¼¢ @ 1½ upon delivery of the first 10 tons: Slabs, 7¢; Moldboards and Landsides, 7¼¢; Shovel Blades, round or diamond point, 7½¢; Shares, parallel sides, 7½¢; ditto, not parallel sides, 9¢; ditto, for Listing Plows, 12¢. Some manufacturers of high-grade Tool Steels have recently advanced their prices with good results. They claim their Steel worth what they ask for it, and their bold action appears to have convinced consumers.

Steel Rails.—The North Chicago Rolling Mill Company's works at South Chicago started up again last week, having completed necessary repairs. This is the only Rail mill now in operation in this vicinity, but the prospects are encouraging for the starting of another in a month or two, as orders are accumulating to such an extent that this may be obligatory. A number of small orders were booked, but no large orders were positively secured. Prices are unchanged at \$30 @ \$30.50. The rumor that the projected consolidation of Steel companies had fallen through is untrue. No obstacle to the plan has yet developed, and nothing has happened to cause the least apprehension of such an occurrence.

Track Supplies.—Small orders only are in the market, but sellers quote as low prices on them and compete as vigorously for them as though they were very large. Steel Fish Plates are quoted at 1.85¢ @ 1.90¢; Iron Fish Plates, 1.65¢ @ 1.70¢; Railway Spikes, \$2 @ \$2.10; Hex. Nuts, 2.70¢.

Old Rails and Wheels.—Prices of Old Iron Rails declined last week, with sale at various rates from \$20.25 down to \$19.75. They are probably worth about \$19.50 at present, although the supply is limited. A lot of several hundred tons of Old Car Wheels was sold at \$18, which seems to be the limit of buyers' bids, although most holders still ask \$19.

Scrap.—Free sales of No. 1 Mill Iron have been made to consumers at \$13 @ \$13.50 net ton. Small quantities of No. 1 Forge were also sold at \$18.50, which now seems to be the top of the market. Machinery Cast is quoted at \$12.50 @ \$13, and Stove Plate at \$10. Low-priced Scrap

like Borings and Turnings appears to hold up better than the more costly grades. Mixed Steel has been offered at \$11.50. Dealers are buying stock from railroads now at very low prices, but still quote \$13 @ 13 50 for Mixed Country.

General Hardware.—Jobbers report a very fair trade in both Shelf and Heavy Hardware. Summer goods are beginning to move off quite actively, and a heavy demand is promised for Screen Doors, Window Screens, &c. Staple articles are freely called for, but prices are cut very close. In most cases the manufacturers are to blame for this state of affairs. They form combinations to maintain prices on certain lines of goods, and then sell other products in connection with them at less than cost, thus neutralizing the effect of the combination and enabling dealers to compete with them in open markets.

Nails.—Prices are not any stiffer than they have been, although jobbers appear to be endeavoring to work their trade into more satisfactory shape. The combination on Steel Nails is being adhered to by the manufacturers, so far as controlling production is concerned, but they are getting uneasy over the slow sale of their product and developments may be expected at any time. Jobbers' quotations are still as follows: Small lots of Steel Nails \$2 and carloads \$1.95; small lots of Wire Nails \$2.40 and carloads \$2.35.

Barb Wire.—As far as can be ascertained, all the manufacturers at work are now full of orders and behind in their deliveries, so that prices are somewhat firmer. Buyers are no longer able to dictate terms. Jobbers' prices are a little higher, but it is not expected that they will advance much, as all of them had evidently placed heavy orders when manufacturers were selling at very low rates. Small lots are now quoted at 2.80¢ for Painted and 3.40¢ @ 3.45¢ for Galvanized.

Pig Lead.—The situation has improved, partly through the disposition of consumers to take hold at present prices and partly through the withdrawal of offerings by holders, who anticipate better prices in the near future. Sales of 300 tons are reported at about 3.47½¢, with 3.50¢ asked at the close and but limited quantities offered for sale.

Copper.—Manufactured Copper holds its own 25¢ rates, but consumers are buying very sparingly. Dealers are carrying light stocks in anticipation of lower prices, of which, however, there is no immediate indication in this market.

Thomas M. Jones, of Jones & Loughlins, who died at Pittsburgh on the 12th inst., was formerly manager of their Chicago branch, occupying the position now held by J. M. Larimer. Mr. Jones was highly esteemed by his associates and his Chicago business acquaintances, who heard of his decease with deep regret.

Pittsburgh.

Office of The Iron Age, 77 Fourth Ave. {
PITTSBURGH, April 16, 1889. }

We can chronicle an increasing volume of business in the Iron and Steel trades, but prices do not improve. So many in the business are in urgent need of money that they are obliged to realize on their product at any price, and this accounts in a great measure for the present depression of prices.

The Amalgamated Association of Iron and Steel Workers will ask that all the Iron mills be closed for two months during the summer. This move has been decided upon by a majority of the lodges, and appears to meet with general approbation on the part of Iron workers.

While there is a difference of feeling in regard to the recent attack of Mr. Andrew Carnegie upon the Pennsylvania Railroad, it is generally agreed that the agitation of the matter may be productive of good results. There are a great many people who agree with Mr. Carnegie that this great corporation has not treated Pittsburgh nor the State of Pennsylvania justly nor equitably, and we believe that the discussion of the matter now going on cannot but be productive of good results.

Iron brokers have become very numerous in Pittsburgh within the past few years, and it is complained that the brokerage business is very much overdone. It is said that some of the city furnaces are making it a point to sell direct to consumers, and thereby avoid the brokers as much as possible. However, nearly all the Iron made at other points is being sold through brokers. Among others, the following named parties and firms are engaged here in the brokerage business: Nimick & Co., A. H. Childs, Shearman, Collard & Co., Robinson & Orr, H. E. Collins & Co., J. H. Hillman, H. G. Dravo, W. P. Snyder & Co., T. G. Boyle & Co., F. N. Hoffstott & Co., Preston & Humphreys and J. W. Porter & Son.

Pig Iron.—There has been a little more activity during the past week, but with this exception the general situation remains unchanged. Consumers continue to buy as their immediate wants require, and it is evident, therefore, that they are not apprehensive of any immediate advance in price, although furnacemen are not particularly anxious in regard to making additional contracts. Standard brands of Mill Iron may be fairly quoted at \$14.25 @ \$14.50, four months. A broker who had an order to buy a round lot at \$14, cash, after canvassing the field pretty well reports that he was unable to find a seller. We can report a sale of 1000 tons at \$14.25, cash; also 500 tons All-Ore Mill at \$15.50, cash. Foundry Irons continue dull, but prices remain unchanged. Small sales No. 1 at \$16.50 @ \$17, cash, and No. 2 do., at \$15.50 @ \$16. Bessemer Iron is lower, sales of 4000 tons reported at \$16.25, and 1000 tons at \$16.50, both cash. We quote as follows:

Neutral Gray Forge.....	@ \$14.25, cash
All-Ore Mill.....	15.50 @ 16.00, "
White and Mottled.....	13.00 @ 13.50, "
No. 1 Foundry.....	16.50 @ 17.00, "
No. 2 Foundry.....	15.00 @ 16.00, "
No. 2 Charcoal Foundry.....	21.00 @ 22.00, "
Cold Blast Charcoal.....	24.00 @ 27.00, "
Bessemer Iron.....	16.25 @ 16.50, "

Manganese.—Sales of Ferromanganese reported at \$59.50 @ \$60 for 80 %, and Spiegel at \$28.50 @ \$29 for 20 %.

Muck Bar.—There is an increased inquiry, but no improvement in prices. We are advised of sales of some 2000 tons at \$26.50 @ \$26.85, cash. Now that there is a considerably increased demand for Skelp Iron there will be a corresponding improvement in the demand for Muck, as some of the mills making a specialty of Skelp buy considerable quantities of Muck.

Manufactured Iron.—The demand for Merchant Iron continues low for the season, but it is improving somewhat, and it is thought will continue to improve as the season becomes more advanced. Some of the mills are pretty fully employed on Skelp Iron, which is still quoted at 1.65¢ for Grooved and 1.90¢ for Sheared. Bar Iron is quoted at 1.65¢ @ 1.75¢, 60 days, 2 % off for cash, according to quality. Old Rail Iron can be had below prices quoted.

Nails.—There is a slightly improved demand, but it is chiefly of a local character, and consequently for small lots. Card rates are still adhered to—\$1.90, 60 days, 2 % off for cash for 12d to 40d. Private advices from Wheeling continue to report business very dull there.

Wrought-Iron Pipe.—This department of the Iron trade continues to improve. Not only are the combination prices being faithfully adhered to, but there is continued inquiry and some of the mills have about all they can do. There has been a decided change for the better since the New York meeting, and it looks now as if there would be a good healthy trade from now until next fall, as new gas and oil fields are being opened up, which will require large quantities of pipe. We continue to quote prices as before: Discounts on Black Butt-Welded Pipe 55 %; on Galvanized do., 47½ %; on Black Lap-Welded, 67½ %; on Galvanized do., 55 %; Boiler Pipes, 62½ % off; Casing, 5¼-inch, 62½ % off; Two-inch Tubing, 13¢ per foot, net; 3-inch Line-Pipe, 20¢; 6-inch do., 53¢; 8-inch, 90¢.

Old Rails.—The market continues dull, and prices are weaker. We now quote American Tees at \$22.75 @ \$23, with a sale of 500 tons reported at inside quotations. Old Steel Rails remain as last quoted; sales at \$17.50 for short and \$19 @ \$20 for long lengths. There appears to be more inquiry for Steel than Iron Rails.

Billets, Blooms, &c.—Demand continues light, while prices remain unchanged; sales Bessemer Steel Billets reported at \$27 @ \$27.50, cash, at makers' mill; Domestic Bloom and Crop Ends, \$18, cash, at which last sales, reported some weeks ago, were made.

Steel Rails.—Heavy Sections are quoted at \$26.50 @ \$27.50, cash, at mill here, according to size of contract, delivery, &c. Carnegie, Phipps & Co. continue to make shipments South and West by river; they have shipped 20,000 tons by river within the past couple of months. The mill of the Allegheny Bessemer Steel Company, at Duquesne, while not so large as some of the others, is claimed to be one of the most complete mills in the country.

Railway Track Supplies.—There is more doing, but no change in prices. Spikes, 2¢, 30 days, delivered f.o.b. at works. Splice Bars, 1.70¢ @ 1.75¢; Track Bolts, 2.75¢ with Square, and 2.85¢ with Hexagon Nuts. It is thought there will be a considerably improved demand within the next few weeks.

Old Material.—The demand continues light, but it is thought there will be an improvement within the next week or two. No change in prices. No. 1 Wrought Scrap, \$19 @ \$19.50, gross; Wrought Turnings, \$13; Car Axles, \$24.50 @ \$25; Cast Scrap, \$14 @ \$14.50, gross; Cast Borings, \$11 @ \$12; Old Wheels, nominal at \$19.

Cleveland.

CLEVELAND, April 15, 1889.

Iron Ore.—There is a steady demand from the furnacemen, but sales during the past week have been confined to comparatively small orders. Additional vessel charters from the upper end of Lake Superior at \$1.25 are reported, and the mine owners claim to have engaged tonnage from Escanaba at 90¢ for six or seven trips. Menominee Ore, particularly from the Chapin mine, is in demand at \$5.10 @ \$5.20, f.o.b. vessels Lake Erie ports. Both Champion and Republic Bessemer are commanding \$5.75, and Ores from the Minnesota mines are selling quite freely at the same figure. What is termed the local market has not yet assumed an active phase, particular attention now being paid to the work of encouraging the Eastern trade. Dealers anticipate orders from this quarter aggregating 750,000 tons. Scattering sales of non-Bessemer Ores at \$4.10 @ \$4.20 are reported, but a number of

large transactions are looked for within the next week or 10 days. A considerable quantity of new Ore will arrive from Escanaba on Wednesday or Thursday of this week.

Pig Iron.—Slight concessions have been made during the past week in order to enliven the market, and in consequence a few sales can be recorded at prices from 25¢ to 50¢ below current quotations. The furnacemen are restricting their output, and basing their hopes on a revival of activity in May. A small lot of good Foundry Iron is said to have sold for \$16.50, but the transaction forms no basis upon which to base quotations, which are entirely contingent upon the circumstances surrounding the different furnaces. Dealers are unable to give reasons for the present dullness, and are inclined to take a hopeful view of the future.

Old Rails.—Prices are again declining, and not over \$21 is being paid for Old American Rails. Other kinds of Scrap are correspondingly depressed.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. }
CINCINNATI, April 15, 1889. }

Pig Iron.—No new features have been developed in the local market for Pig Iron during the week under review. The volume of business has been light; at least individual orders have been small. A weaker tone has prevailed for all kinds and grades and lower prices have been accepted for Foundry make, but Forge Iron has been better sustained. Producers still persist in the view of a more active business and higher prices during the latter half of the year, and make but little effort to sell for present or near-by delivery. Buyers, on the other hand, believe in lower prices before higher are realized, notwithstanding the fact that the furnaces claim prices are already at the cost point and a number blowing out for repairs will not resume until a decided change for the better is indicated. The poverty of the market is well illustrated in the fact that there has not been a 1000-ton order recorded during the week, and even 500-ton sales have been few. Moderate amounts of No. 1 Southern Coke Foundry have been sold at \$14.75, No. 2 ditto at \$14, and there are reports that even these rates have been shaded. Gray Forge has been apparently well sustained at \$13. Car-wheel Irons have remained slow, with stocks at both Northern and Southern stacks accumulating. The following are the approximate prices current here at the close, for cash, f.o.b.:

Foundry.

Southern Coke, No. 1 (new classification).....	\$14.75 @ \$15.25
Southern Coke, No. 2 (new classification).....	14.00 @ 14.50
Southern Coke, No. 3 (new classification).....	13.50 @ 14.00
Ohio Soft Stone Coal, No. 1.....	15.50 @ 16.00
Ohio Soft Stone Coal, No. 2.....	14.50 @ 15.25
Mahoning and Shenango Valley.....	16.50 @ 17.00
Hanging Rock Charcoal, No. 1.....	21.00 @ 22.00
Hanging Rock Charcoal, No. 2.....	19.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 2.....	17.00 @ 18.00

Forge.

Strong Neutral Coke.....	13.25 @ 13.50
Mottled Neutral Coke.....	12.25 @ 12.50
Gray Forge.....	13.00 @

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	20.00 @ 25.00
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	20.50 @ 21.50

Manufactured Iron.—The trade for Finished Iron has not improved, and an easy tone has continued without essential change in prices.

Nails.—There has been an improved demand and a steady market. 12d @ 40d sell at \$1.95 @ \$2 per keg, with 10¢ rebate in carload lots at the mills. Steel Nails sell at \$1.90 @ \$2, and Steel Wire Nails at \$2.55 @ \$2.60 per keg.

Old Material.—The demand has been light for Old Rails, and an easy tone has prevailed, but there has been no pressure to sell, and prices are quotable at \$20 @ \$20.50 per ton, cash. There has been very little inquiry for Old Wheels, which are nominal at \$18 @ \$18.50, cash, spot.

Birmingham.

BIRMINGHAM, ALA., April 18, 1889.

Affairs of the Iron market hereabouts remain practically unchanged. There is but moderate selling, and stocks are accumulating at the furnaces. Hope of better things, coupled with the much improved condition and outlook in monetary circles, braces manufacturers generally. Some, however, still complain of the superior freight-rate advantages given by Northern railways to furnaces in that region. Apropos to this subject, at a dinner given this week to Baron Erlanger, of Paris, France, head of the syndicate controlling the Queen and Crescent Railway system, the matter of freight on Iron products was one of the chief topics of conversation. Mr. Thomas A. Mack, manager of the Eureka Furnace, at Oxmoor, controverted a statement that Birmingham had the best of freight rates. The Southern furnaces were at a disadvantage when it came to a question of rates with the furnaces at the North by at least 25 %, and the railroads here have a great deal to do before they will reach near perfection on that score. Some other expressions, giving instances, added force to the suggestions of Mr. Mack. It is realized that while the South, particularly the Birmingham district, has made wonderful strides in Iron manufacture, the market is not here, but at the North, to the consumption of which that of the South is now as a drop to the bucketful. There is, nevertheless, encouragement for the future in the fact that Birmingham is amply provided with railways, most of them of too recent completion to forecast results, though of palpably sufficient importance to inspire confidence and larger investment.

The directors of the Tennessee Coal, Iron and Railroad Company are to visit the district next week to take a view of their property about here, and it is given out that one of the subjects to which they will devote especial attention will be the making of a test of Steel manufactured by the basic process.

The same forces, which of late years, by means of Iron and land companies, have developed property upon which manufactures most notably of Iron materialized, show signs of renewed buoyancy, which will likely result in something fruitful this spring. Another furnace is promised at Attalla, in Etowah County, on the Alabama Great Southern division of the Queen and Crescent system, and the projectors are assured by the people of that road a branch to the coking coal fields of Murphree's Valley, about 40 miles to the west, a little northeast of Birmingham. This same coal is coked by the Birmingham Furnace and Mfg. Company, who have a plant at Trussville, this county. One of their furnaces went into blast this week. The furnaces are each 125 tons capacity. The managers and principal owners are Connellsville, Pa., men. They say the Coke here averages well up with that of Pennsylvania and is in some respects superior. The developing of Coking Coal, while progressing rapidly, has not been equal to the demand, notably for the furnaces and foundries at Sheffield, Florence, Decatur and Gadsden. Foundries and machine shops at New Orleans and other places ask for contracts larger than can now possibly be met. The early completion of the Birmingham mineral branch of the Louisville and Nashville

Railroad will greatly aid the removal of this embarrassment of manufacturers about here. All the roads touching Birmingham will pursue the same policy as that of the Louisville and Nashville Railroad in reaching out after all mineral properties upon which practical development is taking place. This building of many small new lines has already been of great benefit to Birmingham, and it is confidently believed the near future holds out still greater rewards for labor and capital.

St. Louis.

OFFICE OF *The Iron Age*, 212 N. Sixth st.,
St. Louis, April 15, 1889.

Pig Iron.—Extreme quietness prevails. Some few transactions for small lots are being entered from day to day, but even these are fewer than for some weeks past; prices are correspondingly weak. Any prediction as to the future course of the market seems useless, and the general feeling is to accept the situation and await developments. We quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	\$15.50 @ \$16.00
Southern Coke, No. 2 Foundry,	15.00 @ 15.25
Southern Coke, No. 3 Foundry,	14.50 @ 14.75
Gray Forge.....	13.50 @ 14.00
Ohio Softeners.....	17.00 @ 19.00
Lake Superior Charcoal.....	20.50 @ 21.50

Missouri.

Charcoal Foundry, No. 1.....	16.00 @ 16.50
Charcoal Foundry, No. 2.....	15.00 @ 15.50

Tennessee.

Charcoal Foundry, No. 1.....	17.00 @ 18.00
Charcoal Foundry, No. 2.....	16.50 @ 17.00

Connellsville Coke, f.o.b. East St. Louis, \$4.55; St. Louis, \$4.70.

Bar Iron.—The market shows signs of activity and some fair-sized orders have been booked during the past week. Indications point to a continued improvement, as mills are all busily engaged and have some good-sized orders in view. Prices are a little firmer, but no advance can be noted as yet. For small lots from store we quote 1.80¢, and carload lots 1.60¢ @ 1.70¢, according to circumstances.

Barb Wire.—There is a general improvement in the volume of business, and prices are firmer than they have been for some time. The severe competition and low prices which have characterized this department seems to have been withdrawn. Mills that make a specialty of Plain Wire are running full time, and the difference in price between Smooth Wires and Barbed Wires seems wholly inconsistent, as Plain Wire is held at such figures that it is almost impossible apparently for Barb Wire manufacturers to produce stock at any profit, if they pay the prices quoted for Plain Wire. Mills are quoting from \$2.80 to \$2.85 for Painted, and from \$3.40 to \$3.45 for Galvanized. Carload lots are quoted at from \$2.70 to \$2.75 for Painted, and \$3.30 @ \$3.35 for Galvanized, f.o.b. St. Louis.

Detroit.

WILLIAM F. JARVIS & Co., under date of April 15, 1889, report as follows: Since our last report there has been but little change in the situation here. The market is quite active and the volume of business is above the average for this season of the year. Several large sales of Lake Superior charcoal have been made and in most cases prices have been sustained. Should the demand continue as active for any length of time as it is at present, prices will undoubtedly be advanced. Numerous small orders for Coke Iron have been received and stocks in the hands of small users are very light. In several instances sellers have refused offers a little under figures asked, and it looks as if prices

were likely to range higher instead of lower. We quote for the present as follows:

Lake Superior Charcoal, all num-	\$19.50 @ \$20.00
bers.....	18.50 @ 19.00
Lake Superior Coke, all ore.....	18.50 @ 19.00
Lake Superior Coke, cinder mixed	17.75 @ 18.25
Standard Ohio Black Band.....	18.50 @ 19.00
Southern No. 1.....	17.00 @ 17.50
Southern Gray Forge.....	15.00 @ 15.50
Southern Silvery.....	16.50 @ 17.00
Jackson County (Ohio) Silvery.....	18.25 @ 18.75
Old Wheels.....	18.50 @ 19.00

Louisville.

LOUISVILLE, KY., April 16, 1889.

Pig Iron.—The market is in a peculiar condition, and it is thought a decided change, either for the better or worse, must take place soon. At present prices furnaces cannot continue to make Iron, and claim that unless a change takes place it will be wise for them to blow out. The sales during the past week show no improvement, and some offerings show a tendency to further decline. Furnaces generally seem willing to make sales for long delivery to customers of undoubted credit. There has not been very much Iron placed during the past week, buyers having bought all they desire. We quote as follows:

Southern Coke, No. 1 Foundry,	\$14.75 @ \$15.25
new classification.....	14.25 @ 14.75
Southern Coke, No. 2 Foundry,	14.25 @ 14.75
new classification.....	13.75 @ 14.25
Southern Coke, No. 3 Foundry,	13.25 @ 13.75
new classification.....	12.75 @ 13.25
Gray Forge.....	13.00 @ 13.50
White and Mottled, different grades	16.25 @ 16.75
Silver Gray, different grades.....	14.75 @ 15.25
Southern Charcoal, No. 1 Foundry,	21.75 @ 22.75
No. 1 Mill.....	18.00 @ 19.50
Southern Car-Wheel, standard	15.50 @ 16.00
brands.....	19.50 @ 21.00
Southern Car-Wheel, other brands	20.75 @ 23.75
Hanging Rock Coke, No. 1 Foundry.....	
Hanging Rock Charcoal, No. 1 Foundry.....	
Hanging Rock, Cold Blast.....	

Macfarlane & Murdue, Kenyon Building, Louisville, Ky., dealers in Iron, Coal and Coke, announce that they have succeeded to the business of Kent, Macfarlane & Murdue, from which firm C. J. Kent had withdrawn.

New York.

Office of *The Iron Age*, 66 and 68 Duane street,
NEW YORK, April 17, 1889.

American Pig.—Reports from the West are by no means encouraging, the Cincinnati market again showing a declining tendency, with \$14.75 named for No. 1 Southern Foundry. Since the difference between cost of delivery in Cincinnati and in this market is about \$1 3/4 ton, it is evident that there is considerable margin below the parity in prices quoted here. Southern No. 1 has been offering here at \$16.75 @ \$17, without, however, so far as we can learn, securing much business. Reports are again coming to hand that founders are rejecting Southern Irons, which in some instances may be due to the fact that sales agents in their eagerness to do business have adopted the practice of shipping No. 2 instead of No. 1. There are rumors that some of the Lehigh companies are accumulating Iron, and that deliveries on contracts are being delayed. We are informed, however, by the leading company that current shipments are satisfactory. We continue to quote: Northern standard brands, tidewater delivery, \$17.50 @ \$18 for No. 1; \$16.25 @ \$17 for No. 2 Foundry, and \$15 @ \$15.25 for Gray Forge.

Ferromanganese.—Importers' quotations vary widely, the difference between the lowest and highest bids for a contract for a few hundred tons having been \$3 3/4 ton. We quote \$56.50 @ \$57 as a close price for 80 % Ferromanganese.

Wire Rods.—The market is dull at \$41.25 @ \$41.50 for Foreign.

Old Rails.—The only transaction reported is a lot of 500 tons of Double Heads at private terms. The market is weaker, but irregular, with little offering here, and little demand. At other points lower figures are being made, however. Thus, a lot of 500 tons of Tees is being offered at \$21.25 at Buffalo, which is equivalent to about \$22.50 here.

Track Material.—Spikes remain dull at \$1.95 @ \$2 3/4 keg delivered, with Angles Bars selling at \$1.75 @ \$1.80 delivered for sound lots.

Structural Iron and Steel.—We quote: Sheared Plates, 1.9¢ @ 2¢; Universal Mill Plates, 2¢ @ 2 1/4¢; Angles, 1.9¢ @ 2.1¢; Tees, 2.35¢ @ 2.5¢, and Channels and Beams, 2.8¢, on dock.

Plates.—We quote Iron Tank, 1.9¢ @ 2.2¢; Shell, 2.25¢ @ 2.4¢; Steel Tank and Ship Plate, 2.1¢ @ 2.25¢; Shell, 2.35¢ @ 2.5¢; Flange, 2.6¢ @ 2.75¢, and Fire-box, 3 1/4¢ @ 4¢.

Bar Iron.—We quote: Carload lots on dock, half extras, Common, 1.6¢ @ 1.65¢; Medium, 1.65¢ @ 1.7¢, and Refined, 1.7¢ @ 2¢.

Steel Rails.—Only a moderate amount of business has been done, small sales having been made to Eastern roads aggregating about 1000 tons, while the Manhattan Elevated Road opened bids for 1500 tons to-day. There are a number of bona fide inquiries in the market, aggregating about 20,000 tons, the bulk of them for Southern delivery. We continue to quote \$27 @ \$27.50 for large lots at Eastern mill. The April report of the Board of Control shows aggregate sales of 670,160 tons out of a total allotment of 990,850 tons. Last year up to the same time the sales were 658,513 tons, and in the year 1887 1,494,384 tons. The shipments for the first quarter in 1889 were 244,765 tons, against 184,580 tons in 1888 and 389,532 tons in 1887.

The Moorhead-McCleane Company, W. P. Loughry, agent, 81 John street, have sent out a stock list of Soho C.H.B. Galvanized Sheet Iron, under date of April 13. The exact quantities of Sheets on hand of the different sizes and gauges are given in detail.

Financial.

Business advices are decidedly more cheerful, perhaps in sympathy with the revival taking place in the world of nature. Agricultural operations appropriate to spring are in full activity through the Northwest, where a large area of wheat lands have been seeded, and prospects for the next harvest are auspicious. The statistics for foreign traffic are also favorable, chiefly on account of the remarkably large exports of cotton, the wheat movement being still on a restricted scale. Wheat prices dropped again about 2¢ 3/4 bushel. Corn was lower and pork products had a lower tendency. Sugar advanced 1/4¢ on raw and refined, under speculative management. The exhibit of railroad earnings was not particularly flattering, if comparison is made between the last few weeks, meteorologically considered and the embarrassments that hampered transportation a year ago—blizzards and strikes. General trade in this city is dull.

The Stock Exchange market was influenced exclusively by professional managers in the absence of legitimate traders. A further marked decline in Atchison occurred, affecting the investment market as well as the more general list, but Reading, St. Paul and others among the most active stocks advanced, declining, however, at the close. Various movements in the sugar trust were reported and refineries advanced about 15 %, to drop off again

on Wednesday to 93½. The railroad bond was particularly active.

New York Sub-Treasury operations for the week included the payment of \$5,045,935 for purchased bonds, by which the associated banks gained \$5,004,616. The statement for the week reports an increase of \$5,481,700 cash. As the disbursements by the Treasury counted in the statement of averages for little more than \$2,000,000, the return movement from the interior must have been much larger. The statement was made up, moreover, on rising averages and the actual condition of the banks is much better than it shows. The contraction of loans was regarded as a healthful sign. The changes resulted in a gain of \$4,655,975 to the surplus reserve, which is now \$6,065,550, against \$10,870,425 a year ago, and \$4,488,650 in the same week in 1887.

Money during the week has got into a better shape, funds being in good supply, principally in consequence of disbursements from the Treasury in the purchase of bonds, amounting to nearly \$10,000,000. The threatened export of specie was averted by easy money in London. Rates for time loans are not materially changed, but were to some extent nominal. A return movement from the interior is not improbable, the recent heavy demand from Southern points having wholly ceased. Sterling exchange continues high, and exports of gold in any amount are not apprehended.

The foreign commerce of New York for the month of March and for the last three months makes a favorable showing compared with last year, but the imports of late indicate no "boom," which many expected would follow the settlement of the Presidential contest. While the total imports for the month amounted to \$40,622,000, against \$40,875,000 last year, the specie item fell off nearly \$2,000,000. The total imports for nine months, exclusive of specie, were \$347,838,815, the largest in the history of the trade with three exceptions. The exports for the month, exclusive of specie, were \$28,859,335, against \$22,843,204 last year and \$28,365,160 in 1887. The increase over last March, \$6,016,131, is covered by the increased exports of domestic produce.

Representatives of the silver mining interests on the Pacific Coast are believed to have had an interview with Secretary Windom much less satisfactory than they had hoped for. Senator Stewart, of Nevada, would have the present output of silver coin increased to \$4,000,000 a month, as a way of reducing the Treasury surplus, but the Secretary was unable to see how a mere conversion of gold, greenbacks, &c., into silver would effect this result. It would rather aggravate the evil complained of. More likely the Treasury policy of the last three Administrations would be adhered to for the present; at least until President Harrison's views are better known.

Metal Market.

Copper.—London declined for the week from £39. 15/ spot, to £37. 5/ and futures from £39. 10/ to £37. 10/, sales summing up the large amount of 2675 tons. In their monthly report of April 1 Messrs. James Lewis & Son, Liverpool, expressed themselves as follows: "So far as the mining companies are concerned, they have been able to pay their shareholders very large dividends for 12 months, which will be some set-off to the greatly reduced dividends they are now earning. That it is the interest of these companies to agree to reduce their production until it has been overtaken by consumption is clear. The difference between the price obtained by the three Spanish companies, under their contract with the *Société des Métaux*, of

£70 per ton for Best Selected, and the present value of £45 per ton, represents upon their last year's production of about 50,000 tons a difference of £1,250,000. A reduced production and higher price would considerably diminish this loss; whereas, if production is not decreased by these and other large companies Copper will probably fall to £35 per ton for Best Selected, representing to them a further loss of £500,000. Representatives of 90% of the American production are now in Paris, and it is possible that advantage may be taken of this to endeavor to arrange some means for supporting the market and gradually realizing the large quantities of Copper in the hands of French and other banks and banking firms without ruinously sacrificing them. To accomplish this end it will be necessary that the present holders of the large stocks of Copper here, in France and in the United States should work in unison with the larger producers." The ensuing cablegram was received from London April 13: "The liquidator of the Comptoir d'Escompte, of Paris, will arrive in this city on April 15 for the purpose of opening negotiations whose object is to obtain the canceling of contracts between the Comptoir d'Escompte and the English copper mining companies." Nothing has transpired since with reference to the result of negotiations on the other side on the part of the American mining companies. A cablegram this morning states that prospects in this respect remain cloudy. On the 15th inst. the visible supply of Copper in England and France had reached the unprecedented aggregate of 126,720 tons. During the first quarter Liverpool and Swansea imported 8610 tons of American Copper, against 6789 in 1888. It is stated that the Lake companies are delivering to consumers on this side whatever Copper they may want for their current requirements with the understanding that the price is to be that of the next pool sale. At Philadelphia casting brands changed hands at 12½¢ in the meantime. The following was received from Boston: "April 13, 1889.—The directors of the Boston and Montana Mining Company to-day declared a dividend of \$1 per share to stockholders of record April 29. They also direct that a special meeting of the stockholders should be called, notice of time and place of which will be duly given later, to authorize the issuing of a general mortgage of \$500,000, to provide the means for the company to build itself an adequate smelting plant, which they not only recommend but deem absolutely necessary. They think that the proceeds of these bonds and the profits of the mine will pay for the completion of the new smelting plant and enable the company to pay dividends of at least \$4 per share per annum. The saving made in the cost of Copper by the erection of the smelting plant, it is estimated, will pay the cost of the entire works in less than two years. Mr. Jere Abbott resigned and Mr. A. W. Spencer was chosen a director in his place." "April 16.—There are some hints of inside support of Boston and Montana, which holds at 31½, but it is realized that on a dividend basis of \$4 per year it will return 12½% to the purchaser at present prices. Hence it is likely to hold above 30, unless further bad news is received about the Copper situation. It looks now like a 10¢ per lb market again."

Tin.—There was a decline in the London market during the week from £92. 12/6, spot, to £91. 15/ yesterday, and in futures from £93. 10/ to £92. 15/, sales aggregating 860 tons. Here there were sold 10 tons May, 20 tons June and 10 tons July at 20.70¢; 75 tons July at 20.85¢, and 25 tons August and 25 September at 20.90¢, subsequently 20 tons spot and 20 tons May at 20.67½¢; 10 tons July at

20.65¢ and 15 September at 20.75¢. Messrs. Gilfillan, Wood & Co., Singapore, write, under date March 12: "This month's export of Tin will be moderate, and it is expected that the arrivals for some time will be on a more moderate scale than they have been of late." During the first two months the Straits Settlements exported to the United States 22,230 piculs Tin, against 1888, 9846; 1887, 12,866; 1886, 14,715; 1885, 4205; and 1884, 9841. Spot Tin closes at 20½¢ @ 21¢. **Tin Plates.**—A resumption of activity has been checked by the stiff attitude of importers and the continued high prices demanded by most makers. At the late Birmingham meeting the makers talked as though they all felt very strong, but since then several of them have modified their views and begun to name special prices in order to induce fresh orders. We quote, large lines, ordinary brands, per box: Siemens-Martin Steel, Charcoal finish, \$4.80 @ \$5.50; Coke finish, \$4.60 @ \$4.75; Terns, \$4.12 @ \$4.30; Coke Tins, \$4.30 @ \$4.40, and Wasters \$4.15 @ \$4.20.

Lead.—Toward the close of last week some 400 tons Common Domestic were sold at 3.70¢ for June, most of it, some being May delivery at 3.72½. As refiners wished to check the advancing tendency they put 50 tons on the market and sold them at 3.65¢, but it was of no avail, the market rallying since to 3.70¢ asked and 3.67½¢ bid, at which it closes strong. The Western markets are firm at 3.40¢ @ 3.45¢.

Spelter.—Has remained featureless at 4.65¢ @ 4.70¢ for Common Domestic, with only a small business transacting, while Silesian continues to be held nominally at 5.50. @ 5.62½.

Antimony.—A good consumptive demand has been noticeable at 12¢ @ 12½¢ Hallett's and 13½¢ Cookson's.

New York Metal Exchange.

The following sales are reported:

THURSDAY, April 11.	
200 tons Lead, May.....	3.67½¢
FRIDAY, April 12.	
16 tons Lead, May.....	3.70¢
25 tons Tin, July.....	20.85¢
25 tons Tin, July.....	20.90¢
25 tons Tin, August.....	20.90¢
25 tons Tin, September.....	20.90¢
25 tons Tin, July.....	20.80¢
10 tons Tin, May.....	20.70¢
20 tons Tin, June.....	20.70¢
10 tons Tin, July.....	20.70¢
SATURDAY, April 13.	
10 tons Tin, spot.....	20.70¢
10 tons Tin, May.....	20.65¢
10 tons Tin, spot.....	20.65¢
MONDAY, April 15.	
10 tons Tin, May.....	20.70¢
15 tons Tin, September.....	20.75¢
TUESDAY, April 16.	
10 tons Tin, July.....	20.65¢
WEDNESDAY, April 17.	
10 tons Tin, September.....	20.75¢
33 tons Lead, June.....	3.70¢

A special to the Metal Exchange, from London announces that L. Lazarus & Son have bought nearly 1000 tons of Copper this morning, but the market is generally selling. Prospects for a combination of the mining companies are very cloudy, and a new pool very doubtful. No positive information obtainable as yet regarding result of negotiations.

Coal Market.

The Anthracite Coal market continues to be dull and weak. Although this is usually the unfavorable season, it has proved to be more so this year than ever before, for reasons to which we have already alluded. The inquiries are chiefly for the smaller steam sizes, and it is therefore only Pea and Buckwheat Coal which are in good demand. The new rates of toll went into effect on the 15th. Prices may be quoted as follows, the lower figures

being made by individual operators: Broken, \$3.50 @ \$4; Egg, \$3.75 @ \$4; Stove and Chestnut, \$3.75 @ \$4; Pea, \$2.50 @ \$3. The Chicago Bureau of Anthracite Coal statistics reports the receipts for the first quarter 45,381 tons, and the stock on hand 461,359 tons, a total of 506,740 tons, as compared with 332,416 tons in 1888, an increase of 184,324. For the week ending April 7 the output was 503,582 tons. The Reading Company have suspended operations two days last week, and will stop the two last days of this week and Monday of next week. This, it is hoped, will somewhat aid the market.

The Bituminous Coal trade is quiet, although relatively in a better condition than the Anthracite market. Prices are quoted: \$2.25 @ \$2.40, f.o.b., Baltimore, and \$3.25 @ \$3.50, alongside, New York. Some contracts have been placed in the New England market.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, April 17, 1889.

Copper has been active during the week. Large buying orders for Merchant Bars were received and executed prior to Friday, and for a time the market looked like recovering. Subsequently a heavy quantity was pressed for sale, and weakened the market greatly, resulting finally in sales at £37, cash, or 40/ decline from the highest point of the week. The fact has been disclosed that the Spanish Mining Company have delivered to the Société des Métaux three times the quantity of Copper stipulated for in the original contract. It is also said that the Mason & Barry Company will soon begin legal proceedings against the Société. Matters are in so complicated a condition that there seems now to be very little chance of producers and holders coming to an agreement. Consumers are now buying below the level intended by the negotiator, and manifest no inclination to deviate from their present course. It is announced that the quantity of Copper under the control of the Comptoir d'Escompte was 170,000 tons, distributed among 11 banks, two of which have realized. The mines of the Caradon Company have been closed, and will remain so until the market is in better shape. Best Selected Copper is scarce, except at comparatively high prices, as the companies are not free to sell. The price is now, nominally, £45, against £37 for Merchant Copper.

Tin Plate makers booked heavily at the quarterly meeting, and are very firm on prices, despite the present heavy production and accumulation of stocks at the shipping ports. The total stock is now about 351,000 boxes, against 248,000 boxes the corresponding period last year. The project of the formation of a syndicate to regulate prices and production has been revived. The proposition provides for curtailing the make and advancing prices about 1/ per box.

Pig Iron warrants have declined sharply, Scotch selling to 43/11, Middlesboro' to 38/6, and Hematites to 49/, under the effect of pressure from the "bears." Outsiders have been operating freely, and their purchases give the market some support. In makers' brands trade has been quite brisk, but the course of warrants has somewhat

adversely affected prices. Manufactured Iron continues active, and prices are very firm.

Foundry Pig has advanced to 57 marks in the German market.

There is more old material offering in this market, and prices are somewhat irregular, and rather too high for business on a liberal scale.

In the Steel department there is considerable activity, more particularly in Rails and Billets, prices for which continue strong.

Scotch Pig.—Business fairly active, but prices a shade lower on most brands.

No. 1 Coitness, f.o.b. Glasgow	56/
No. 1 Summerlee, " "	55/3
No. 1 Gartsherrie, " "	55/
No. 1 Langloan, " "	55/3
No. 1 Carnbroe, " "	48/
No. 1 Shotts, " at Leith	55/
No. 1 Glengarnock, " Ardrossan	52/
No. 1 Dalmellington, " "	46/6
No. 1 Eglinton, " "	45/

Steamer freights, Glasgow to New York, 2/6; Liverpool to New York, 10/.

Cleveland Pig.—Less doing in this line and the market not so firm. No. 3 Middlesborough, G.M.B., 38/6 @ 39/ prompt.

Bessemer Pig.—There has been a large business at somewhat lower prices. West Coast brands, mixed numbers, 49/ @ 49/6, f.o.b. shipping point.

Spiegeleisen.—A fairly good demand and prices firmly held. English 20% quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—The demand continues quite active and makers' prices firm. Heavy sections quoted at £4. 12/6, and light sections £4. 17/6 @ £5, f.o.b. at N. W. England shipping point.

Steel Blooms.—A quite good trade in these at firm prices. We quote £3. 19/3 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Higher prices are quoted and the market continues active. Bessemer, 2½ x 2½ inch, £4. 7/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—The demand moderate and prices held firmly. Bessemer, £3. 19/6, f.o.b. at N. W. England shipping point.

Old Rails.—Business slow and buyers and sellers apart on prices. Tees quoted at £3. 5/ @ £3. 7/6, and Double Heads, £3. 12/6 @ £3. 15/, c.i.f., New York.

Serap Iron.—No improvement in the demand. Prices barely steady. Heavy Wrought quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—Sales moderate and at unchanged prices. Bessemer quoted £2. 10/ @ £2. 12/6, f.o.b.

Tin Plate.—Business has been fairly active at generally firm prices. We quote, f.o.b. Liverpool:

1C Charcoal, Allaway grade	15/3 @ 15/9
1C Bessemer Steel, Coke finish	13/6 @ 14/
1C Siemens " "	14/ @ 14/6
1C Coke, B. V. grade	@ 13/3
Charcoal Terne, Dean grade	12/6 @ 13/

Manufactured Iron.—There is still a brisk business in this department and prices are very firm. We quote, f.o.b. Liverpool:

Staff. Ord. Marked Bars	£ s. d. @ 8 2 0	£ s. d. @ 5 17 6
" Common	" " " " " "	" " " " " "
Staff. Bl'k Sheet, singles	7 12 6 @	" " " " " "
Welsh Bars (f.o.b. Wales)	5 2 6 @	5 5 0

Copper.—The market quieter at the close and weak. To-day's prices were: Bars, £37 for spot; £37 @ £37. 5/ for three months' futures. Best Selected, £45.

Tin.—A fairly active business at the decline, closing firmer. Straits sold at £91. 10/, spot, and £92. 5/ for three months' futures, reacting 10/ @ 15/.

Lead.—The demand fair and prices very steady. Quoted at £12. 12/6 @ £12. 15/ for Soft Spanish.

Spelter.—More activity in this metal and prices firmer. Quoted at £17. 10/ for ordinary Silesian.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira	19.3
Florin (Netherlands)	40.2
Florin (Austria)	35.9
Witels (Portugal)	1.08
Witels (Brazil)	54.6
Mark (Germany)	23.8
Kilogram	2.205
Picul	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, March 15, 1889.—**Asphaltum.**—There has been increased activity in purchases for export at \$14.04 ½ ton Boiled, inclusive of export duty, free on board, and \$6.84 Crude. Shipments since January 1 sum up 12,432 tons, against 10,568 and 3523 respectively same time in 1888 and 1887. **Exchange.**—Ninety days' sight on London \$4.74 @ \$4.80. —E. P. Masson.

CHILI.

VALPARAISO, February 15, 1889.—**Copper.**—In view of the drooping tendency in London sales have been restricted to 19,713 quintals at \$23, which at 29½d exchange equals cost and freight £86. 18/4 in England. **Coal.**—Shipments from England are decreasing, and Newcastle now commands 37/ on the spot and 40/ afloat, while Australian may be had at 25/ @ 27/6. **Exchange** closes at 29½d for 90 days' sight drafts. —Weber & Co.

EAST INDIES.

MANILA, April 8, 1889.—**Hemp.**—There are buyers at \$14 ½ picul, against \$8.12½ same date last year, equalling ½ ton cost and freight £48, against £29. 5/; clearances for the United States since last cable have amounted to 15,000 bales, against none last year; since January 1 there were 105,000 bales, against 43,000; loading for ditto, none, against 20,000; cleared for England since January 1, 79,000, against 104,000; loading for ditto, 9000, against 4000; cleared for all other ports, 10,000, against 20,000. Receipts at all ports since last cable, 11,000, against 5000; ditto since January 1, 186,000 bales, against 157,000 in 1888 and 123,000 in 1887. **Freight**, \$7.50, against \$5. **Exchange**, six months' sight, 3/7, against 3/8½. —Ker & Co., per cable direct to their agent, Mr. Charles Nordhaus, 89 Water street, New York.

SOUTH AFRICA.

PETRORIA, Transvaal, March 1, 1889.—**Gold.**—It is difficult to ascertain even approximately the actual gold production in South Africa, as so much of it leaves the country in the hands of private persons. The only positive figures are furnished by the official returns of exports at Natal and ports of the Cape Colony. These have been as follows:

1870 to 1880.....		£324,666	
1881.....	£17,952	1885.....	£69,543
1882.....	22,040	1886.....	134,709
1883.....	30,457	1887.....	235,937
1884.....	39,005	1888.....	880,464
Total.....	£109,454	Total.....	£1,320,653

The increase during the past four years has, according to these figures, been more than twelfold, the Transvaal furnishing the bulk, and the outlook being more promising than ever this year. —Argus.

SWEDEN.

STOCKHOLM, April 4, 1889.—**Iron Ore.**—Ore shipments have had to be suspended till now, as the Gellivara-Ofoten Railway was not in running order, owing to the snow blockades, but four trains of Ore now arrive at Lulea daily, where 40,000 tons are awaiting steamers to load the same. As soon as navigation opens, great activity will prevail. —Dagbladet.

SPAIN.

BILBOA, March 30, 1889.—**Iron Ore.**—Orders continue flocking in from all the chief iron manufacturing regions in Western Europe, and the activity on the spot and "to arrive" causes

great stiffness in the value of Ores, which tend upward. There has been no difficulty in obtaining 8/4 @ 8/8 for Rubios, and 7/2 @ 7/5 for Campiul; the former is, moreover, scarce, and will be more so after a while. The output is under control of but a few mining concerns. Shipments since January 1 amount to 1,009,592 tons, against 930,386 same time last year. Pig Iron is dull, and only 1050 tons went coastwise during the week.—*Bilboa Marítimo y Comercial.*

HOLLAND.

ROTTERDAM, April 4, 1889.—*Tin.*—Since the beginning of the month there has been an improved tendency, 57.12½ guilders @ 100 kg. now being offered for both Banca and Billiton on the spot. Following are the March statistics in Holland:

Banca.	1889. Slabs.	1888. Slabs.	1887. Slabs.
April 1. Company's stock on warrants at Amsterdam.....	19,361	19,413	14,828
April 1. Company's stock on warrants at Rotterdam.....	22,298	24,042	14,740
Totals.....	41,659	43,455	29,568
Billiton stock in Holland.....	22,483	30,008	23,070
Totals.....	64,142	73,463	52,638
March deliveries of Banca.....	11,550	11,400	9,826
March deliveries of Billiton.....	5,705	1,913	8,992
Total deliveries.....	17,255	13,313	18,818
Banca afloat.....	7,200	12,800	11,200
Stock in Company's hands awaiting coming auctions.....	137,285	90,436	52,227
Billiton afloat.....	39,260	34,950	24,300
Price of Banca, fl.....	56¼	98	61¼
Price of Billiton, fl.....	56¼	101¼	61¼

—Koch & Vlierboom.

BELGIUM.

BRUSSELS, April 6, 1889.—*Iron.*—The Belgian iron markets remain firm throughout; Foundry Pig continues tending upward. We quote to-day in francs @ 100 kg.: Luxembourg Foundry, 5.10 @ 5.20; Charleroi do., 6.50; do., Forge 4.80 @ 5.50; Luxembourg do., 4.80 @ 4.90. Beams were partially affected by French competition, but have righted again under a brisk export demand, and all makers are busy. Plates and Sheets are scarce; the advance obtained is therefore justified. All Structural works are fully booked. The demand for building purposes is brisk. Railroad Material is also moving off satisfactorily. The proposed removal of the import duty on Pig Iron will benefit the Longwy French blast furnaces more than any other. Luxembourg Foundry Pig will also derive advantages from it. We quote Merchant @ 100 kg.: Nos. 1 to 3, 12.50 @ 14.50; do. at Antwerp, 13 @ 13.50; Beams, 11.75 @ 12; Angles, 13 @ 14.25, and Sheets, 16 @ 25.—*Moniteur des Intérêts Matériels.*

Reports indicate that the Amalgamated Association of Iron Workers propose to ask that the iron mills be closed down for two months during the summer, just as the glass factories.

It is reported that the Heckschers, who are interested in the Bethlehem Zinc Works, have acquired by purchase a zinc works at Japlin, Mo.

Bolckow, Vaughn & Co., of Middlesborough, have introduced in their mills a simple device for increasing the life of rolls. Breaks of large rolls are apt to occur after the mill has been idle for some time, notably on Mondays, because the passage of hot metal through the cold rolls causes strains which lead to fracture. Bolckow, Vaughn & Co. have aimed to avoid this by slowly and uniformly heating the rolls before beginning work. This is done by a series of gas jets arranged on both sides of the rolls level with the necks. The gas pipe is attached to the journal so that it can move up and down with it. After lighting the gas jets the rolls are slowly turned, thus heating them uni-

formly. It is reported that in one English mill the life of rolls increased from 79 days to 342 days, and in another mill a set of 36-inch rolls seven feet long, which had been used for 342 days, broke as soon as previous heating was suspended.

The Phonopore.

Some two years since the London *Times* called attention to an important advance made in electric science by C. Langdon-Davies. This referred to the invention of the phonopore, an instrument by means of which electrical effects are produced under conditions which had previously been thought to make them impossible. At that time were recorded the results of a demonstration of the practical working of the system in connection with the telegraph line between London Bridge and Folkstone. Since then improvements have been made and the system perfected. For some months past a practical test has been made upon a telegraph line on the Midland Railway.

In order to render a description of the experiments and their results clear, says the *Times*, it will be necessary at the outset to describe briefly the nature of the invention. And here we must first refer to the well-known fact that, if a telephone be inserted in a wire situated near to a line of telegraph wires, every passing current will produce noises in the telephone, notwithstanding that the telephone wire be perfectly insulated from the telegraph wires. These noises are known as induction noises, and it was while investigating the phenomena of induction with the view of devising means to obviate its effects in telephones that Mr. Langdon-Davies made the discovery which has led to the important results under consideration. His investigations led him to the conclusion that induction was caused by some form of electrical force, which might be separated from currents, and which would pass freely through insulations impassible by currents. He further concluded that if this were so a new series of instruments might be constructed for the utilization of this force, and capable of being put in operation in company with current instruments on the same wire. His conclusions have been proved to be perfectly correct by what has since resulted from the development of the principle. Instruments have been made which represent a system of communication of the highest practical utility, and by means of which Mr. Langdon-Davies has added a distinct and independent chapter to the history of electrical development. The only form of electrical force which finds free passage through these instruments appears to be always capable of being associated with sound. The inventor has therefore denominated the force "phonopore impulse," and the instrument the "phonopore."

It is certainly very remarkable, and to some it may appear almost incredible, that phonoporic messages can be transmitted and received through an ordinary line wire by the phonopore, while at the same time telegraphic messages are being transmitted and received through the same wire by the ordinary telegraphic apparatus. No less remarkable is it, but it is no less a fact, that the phonoporic instruments have no conducting circuit through them. The phonopore gives uninterrupted passage to electrical effects capable of being associated with sound, although it does not permit the passage of electric currents. Externally the phonoporic transmitter resembles an ordinary Morse key, mounted on a base about 4 inches high, containing an instrument somewhat similar to an induction coil. The impulses are generated in a specially-constructed primary circuit, over which is

wound, in place of a secondary circuit, a phonopore, consisting of two wires insulated from each other throughout their whole length and at both ends. Each of these wires, however, is connected at one end to the line. The number of phonoporic impulses generated per second in the transmitter is regulated by the vibrations of an organ reed placed in the primary circuit. Another reed tuned to the same rate of vibration is placed as a receiver at the distant station in front of an electromagnet, and the phonoporic impulses from the transmitter cause it to vibrate. A special form of contact-breaker, operated by the receiver reed, completes a local relay when the reed is still, but breaks it whenever the reed vibrates at its proper rate, thereby setting in action any required instrument in connection with any battery. Divested of its technical surroundings, the phonopore presents itself as a small and simple apparatus, consisting only of a pair of insulated copper wires.

We now turn to its practical application, and to make this clear we will suppose that an ordinary telegraph line from one town to another is provided at each end with the usual telegraph instruments, and that, owing to increase of business, it becomes necessary to provide some additional means of communication. All that is now necessary is to attach to the line at each end a phonopore, without in any way altering the existing instruments, batteries or line. The phonopore can be worked at the same time as the ordinary telegraph instruments, and one is thus made to do the work of two. If the line is already duplexed by ordinary duplex telegraph instruments, the addition of the phonopore will quadruplex it. If the line is—as a few trunk lines are—quadruplexed, the phonoporic instruments will "sextuplex" or "octuplex" it. Indeed, it would seem difficult at present to assign any limit to the multiplex carrying capacity of the new system. Upon the artificial line which Mr. Langdon-Davies has set up in his laboratory messages were transmitted at the recent demonstration, first, by the ordinary telegraph instruments alone, and, secondly, by a phonoporic instrument alone. In the next place the ordinary telegraph instrument and the phonopore were worked together in opposite directions duplex, after which the ordinary instruments and the phonopore were worked together in the same direction duplex. The final experiment consisted in the ordinary telegraph and both the phonopore telegraphs being worked together simultaneously through the single line. The three messages were perfectly transmitted, although some of the operators had not previously used the phonoporic instruments. These experiments proved not only the complete possibility of simultaneous working, but that the phonopore can be arranged to work ordinary telegraph instruments, and that when used in duplex or quadruplex work it requires no special regulating or balancing. They also proved that any wire already provided with an ordinary service can instantly be duplexed by merely attaching the phonopore instruments. On a second artificial line there were installed two harmonic phonopore sounder telegraphs, constituting a duplex service without any arrangement whatever to balance the lines, and working through a resistance equivalent to that of about 6000 miles of telegraph wire. Messages were perfectly transmitted through this line in both directions at the same time.

The coal rates within the 40-mile radius from Pittsburgh to Mahoning and Shenango Valley points have been fixed at 60 cents, a reduction of 10 cents from the old rate. The new rates went into effect on Monday, the 15th inst.

Hardware.

There is a moderate movement in trade in this market, and while in some jobbing centers a good business is reported, there is general complaint on the part of manufacturers and merchants that trade is not up to anticipations. Purchasers are confining their orders to near requirements, and have a good deal of distrust as to the course of the market, recognizing its lack of strength, and notwithstanding that prices are admitted to be very low, apprehending a further shrinkage. There are, however, few changes to note. Most lines of staple seasonable specialties are in good demand. Collections are rather slow.

Cut Nails.

The volume of business is increasing and the market is staidier, so that the reports or shading \$1.80 on dock for car-load lots for standard Iron Nails are growing less frequent. The agreement of the Eastern Nail manufacturers is still going the rounds. While the movement is regarded as affording much promise by the great majority of the mills, it is only fair to state that a few are not very sanguine as to the outcome, and some question the wisdom of giving a new lease of life to weaker concerns.

James M. Swank, General Manager of the American Iron and Steel Association, has just published the following statistics of the

PRODUCTION OF IRON AND STEEL CUT NAILS:

Our statistics of the production of Iron and Steel Cut Nails and Cut Spikes in the United States do not embrace Railroad and other Spikes made from Bar Iron, Wire Nails of any size, or machine-made Horse-shoe Nails. For the sake of brevity we shall make no further reference to Cut Spikes, treating them as Nails.

Our total production of Cut Nails in 1888 was 6,493,591 kegs of 100 pounds each, against 6,908,870 kegs in 1887, 8,160,973 kegs in 1886, 6,696,815 kegs in 1885 and 7,581,379 kegs in 1884. The production of 1886 was the largest the country has ever attained. The decrease in the production of Cut Nails in the last two years has been mainly due to the increased competition of Wire Nails. In 1886 the production of Wire Nails was about 600,000 kegs, made by 27 Wire-Nail works; in 1887 the production was estimated to have been 1,250,000 kegs, made by 47 works; and in 1888 the production is estimated to have been 1,500,000 kegs, or 150 per cent. more than in 1886. The smaller sizes of Wire Nails are those which have heretofore chiefly competed with Cut Nails, but all sizes Wire Nails are now in general use.

Twelve States made Cut Nails in 1888:

States.	1888—Kegs of 100 pounds.			Total 1887. Kegs.	Total 1886. Kegs.
	Iron.	Steel.	Total.		
Penn.	1,051,938	1,021,031	2,072,969	2,238,165	2,569,237
Ohio	123,101	1,390,850	1,513,951	1,672,128	1,703,790
W. Va.	213	1,144,938	1,145,151	827,325	809,600
Ind.	97,476	77,321	174,797	309,040	339,932
N. J.	270,912	4,679	275,591	346,117	345,168
Ill.	.....	241,981	241,981	275,072	614,055
Mass.	176,179	104,122	280,301	267,453	516,749
Cal.	215,000	25,000	240,000	158,193	224,163
Va.	185,844	50,911	236,755	250,519	212,532
Ky.	.....	206,783	206,783	159,720	144,000
Wis.	41,715	.....	41,715	78,940	205,480
Ala.	.....	.....	.....	54,000	206,500
Col.	7,729	37,268	44,997	45,725	52,385
Tenn.	.....	.....	.....	36,473	88,289
N. Y.	.....	.....	.....	.....	34,015
Neb.	.....	.....	.....	.....	5,000
Total cut	2,170,107	4,323,484	6,493,591	6,908,870	8,160,973
Wire	.....	.....	1,500,000	1,250,000	600,000
Total nail production	.....	.....	7,993,591	8,158,870	8,760,973

The rapid displacement of Iron Nails by Steel Nails which has been noticed during

the last few years was continued in 1888, about two-thirds of the total production of Cut Nails in that year being made of steel. In 1884 the production of Steel Nails in the United States (including 500 kegs of combined Iron and Steel) was only 393,482 kegs, or 5 per cent. of the total production. In 1885 the production of Steel and combined Iron and Steel Nails was 1,823,127 kegs, or 27 per cent. of the total production. In 1886 the production of Steel Nails alone was 2,968,989 kegs, or 36 per cent. of the total production. In 1887 the quantity of Steel Nails produced exceeded that of Iron Nails, being over 50 per cent. of the total production; and in 1888 the Steel Nails made amounted to over 66 per cent. of the total production. California made 215,000 kegs of combined Iron and Steel Nails in 1888, and Massachusetts made 3577 kegs. We have classed these in the table with Iron Nails.

The leading Cut-Nail producing district of the United States is known as the Wheeling district. It embraces four counties, all bordering on the Ohio River—Ohio and Marshall counties in West Virginia, in which counties all the nail works of the State are located, and Belmont and Jefferson counties across the river in Ohio, the city of Wheeling being near the center of the district. A widely extended section of Central Pennsylvania, embracing 11 counties drained by the Susquehanna River and its branches, has for several years constituted the next most important Cut-Nail district of the country. Many years ago, however, Allegheny County, Pa., was the leading district in the country, but it has now fallen far behind. The following table shows the production in kegs of Iron and Steel Cut Nails in all these districts in the last five years.

Dist.	1884.	1885.	1886.	1887.	1888.
Wheeling	1,901,570	1,297,136	1,858,551	1,848,116	2,137,845
Central Penn.	1,083,906	1,472,797	1,489,482	1,222,400	1,109,377
Alleghy Co., Pa.	459,512	176,258	121,441	277,410	232,762

The decline in the Wheeling district in 1885 was due to a prolonged strike, which benefited the Central Pennsylvania district.

Miscellaneous Prices.

The Freezers made by the Gooch Freezer Company, Cincinnati, Ohio, are sold at the following discounts:

	Discount.
Peerless.....	.60&10 %
Giant.....	.60&10 %
Zero.....	.65&10 %
Pet.....	.65&10 %
Boss.....	.65, 10&10 %

The D. M. Steward Mfg. Company, Chattanooga, Tenn., issue circulars relating to their Metal-Workers' Crayons, Rolling-Mill Crayons, &c. These goods, in case lots, are sold at the following prices, subject to a discount of 25 per cent.:

	Per gross.
Metal-Workers' Crayons.....	\$2.50
Rolling-Mill Crayons.....	2.50
On five-case lots or more a special discount is made.	

The Gibbs Lawn Rake Company, Canton, Ohio, quote their Lawn Rakes and Post-Hole Diggers at the following prices: Gibbs Lawn Rakes, discount 50 and 15 per cent.; Canton Lawn Rakes, discount 50 and 10 per cent.; Gibbs Post-Hole Diggers, \$30 per dozen, subject to a discount of 50 per cent.; Imperial Post-Hole Diggers, subject to a discount of 45 per cent. The company report that their sales to date are in excess of last season, which, considering the slowness of trade, is regarded as indicating the favor with which they are received by the trade.

The following are the prices of the Economy Ice-Cream Freezer, manufactured by the Kingery Mfg. Company, Cin-

cinnati, Ohio, for whom the Alford & Berkele Company are special agents, 77 Chambers street, New York:

	Per dozen.
2 Quart.....	2.50
3 Quart.....	2.50
4 Quart.....	2.50

Referring to the business of the present year, a leading Pittsburgh jobber writes as follows:

Our volume of business the first quarter of 1889 is much larger than it was the corresponding period of last year. Prices are lower than I have ever known them in almost everything in our line of goods. Manufacturers of Nails and many other lines of Hardware can only be running their works at a loss. Even at loss they are obliged to run, for the loss would be great to shut down. Their trade must be held, and idle machinery depreciates as much as that which is worked.

Granite and Agate Ware are still sold to a considerable extent from the old list, the new list not having yet come into general use.

Obituary.

George H. Churchill, of the Hardware firm of Clark, Churchill & Co., Bloomington, Ill., died April 3. He had been sick for a few days, but was not considered dangerously ill until within a few moments of his death. At noon on the preceding Sunday he was taken ill with what the physicians pronounced diphtheria, but though kept from his business he was able to be about the house. He was 37 years of age and was a native of Portland, N. Y., and for six years a resident of Bloomington. He is referred to as among the promising merchants of his city, with many of the qualities that go to make a successful man, and the manner in which he is referred to indicates the esteem in which he was held.

Items.

Morley Bros., East Saginaw, Mich., have issued a large and imposing catalogue representing the varied lines which they are offering as jobbers and manufacturers. It is a volume of more than 1000 pages, clearly printed, well arranged and strongly bound, making a serviceable catalogue which will be appreciated by their customers. The title page is engraved and represents the different buildings occupied by the business of the house, including the stores, factory and warehouse. It is evident that in the arrangement of this volume the effort has been made, and successfully, to secure the display of a large variety of goods in as small a space as is consistent with their suitable representation and the full descriptive matter. It is also to be noticed that the line of goods represented in the volume is very large, including in addition to the regular line of Hardware, Tools, House-Furnishing Goods, &c., a line of Wooden-Ware, Tinware, Harness, Saddlery Hardware and Whips, Paints, Oils, &c., Electrical Supplies, Brushes, Showcases and other goods of interest to the trade. In the department devoted to the goods manufactured by them the Blue Line Lumbering Tools, Ox Yokes, Ox Bows, &c., are given a prominent place, while their Railroad Stepladders are also illustrated and their construction shown. A pleasant effect is produced by the introduction of colored labels, as on Axes, and the bronze finish applied to other goods, thus giving a touch of color, which adds to the attractiveness of the volume. In nearly all cases list prices are given on the goods, the lists being carefully revised up to date. The volume closes with a number of tables in regard to staple goods, giving the weight, number, thickness, &c., and other useful information. It is a valuable addition to the Hardware trade literature.

The Hulbert Fence and Wire Company, St. Louis, Mo., have issued catalogue No. 12 for 1889, and in it show an enlarged

line of Wire Goods, of which illustrations are given with appropriate descriptions and list prices.

The Samuel Winslow Skate Mfg. Company, Worcester, Mass., issue a circular describing the Vineyard Bicycle, of which illustrations are given, with a statement of its special features.

Hubbard & Co., Pittsburgh, Pa., announce that the destruction of their works in Pittsburgh on the 7th inst. will not prevent the prompt execution of orders for Axes and Hoes, provided they are furnished with specifications immediately, the large capacity of their Beaver Falls works having been increased to meet all demands for these lines. On Saws and Shovels they will, however, be temporarily suspended.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., under date April 2, have issued their catalogue No. 102, devoted to goods connected with summer sports. To this interesting line 48 pages are devoted, with copious illustrations and list prices.

C. E. Hudson, Leominster, Mass., advises us that he has recently made arrangements with three large wholesale houses in Canada—Haverhill, Learmont & Co., and Benny, McPherson & Co., of Montreal, and Wood & Leggat, of Hamilton, Ont.—to have the entire sale of his Rocking Table and Little Star Apple Parers in that country the present year, and has already received orders from them for about 1000 dozen machines. He advises us that he will fill no orders from other parties there this season.

R. Hoe & Co., New York, have issued their Saw catalogue for 1889, in which special attention is given to their Chisel-Tooth Saws, the special features of which are illustrated.

"Syracuse and Its Surroundings" is the title of an artistic pamphlet representing that city, its public buildings, principal industries, &c., together with a number of very tasty sketches of scenery in the vicinity. Among the business houses thus represented are the works of E. C. Stearns & Co., the illustration of which indicates their extent and completeness.

The catalogue of Indurated Fibre Ware issued by Cordley & Hayes, 173 and 175 Duane street, New York, gives a description of the various lines, their uses and dimensions, while interesting information is also given in regard to the process of manufacture. Retail prices only are quoted, from which a trade discount of 25 per cent. is given. It is also stated that Pails are now painted to represent the Indurated Fibre Ware, and that other imitations are being put on the market.

Schulte, Lohoff & Co., Evansville, Ind., issue a price list of their line of Edge Tools, including Shingling, Half, Lath, Claw, Solid Steel Shingling and Broad Hatchets, Carpenters' and Ship Carpenters' Adzes, Butchers' Choppers, Kitchen Cleavers' and Carpenters' Pincers, of which they have been manufacturers for two years. They allude to their goods as being in excellent demand and are contemplating the building of a new addition to meet the requirements of their trade. They are now running exclusively on Tools and Steel Castings, which are cast from crucible furnaces.

The Corbin Cabinet Lock Company have on exhibition in their Chicago salesroom, 63 Washington street, a specimen cabinet of post-office boxes, equipped with their new post-office lock. The boxes have a metallic framework in front, of ornamental design. The doors are metal, with a glass inserted in each, to permit the interior to be seen. The locks are very ingeniously con-

structed, each lock being of the same pattern, yet each being capable of an arrangement of the tumblers so that no two keys are alike. A master key, to be used by the postmaster alone, will unlock any of the locks from the inside in case a key should be lost and it becomes necessary to reset the lock to a different combination of the tumblers. The keys are small and flat. The cabinet of boxes shown has 26 compartments, and is suited to the requirements of a post office in a town of 300 or 400 inhabitants. The post office at Peoria, Ill., was recently fitted with boxes of this pattern. They have also been put into the post office at Council Bluffs, Iowa. The post offices of Evanston and Lake View, Ill., are now having them put in. A large number of offices in large and small towns in various other parts of the country are using them.

On the 10th inst. what is said to be the longest train of Farming Implements that ever crossed the continent arrived in Chicago from Massillon, Ohio, and left at 10.40 a.m. on a special over the Wisconsin Central Railroad, the destination being Portland, Ore. The train, which consisted of 26 cars, the first 5 of which were equipped with air-brakes, stood in the Forty-eighth street yards, and was admired by the officials of nearly every road centering in Chicago. The value of the Implements, which included 46 Threshers, 32 Farm Engines, and 24 Horse-Powers, is estimated at \$80,000. From the engine to the caboose a long white streamer was stretched, on which was painted in black letters "Russell & Co., Massillon, Ohio. To Russell Farming-Implement Company, Portland, Ore. The longest train of its kind that ever crossed the continent." The train was taken through on passenger time, and was expected to arrive at its destination in a week from its departure from Chicago.

Matthai, Ingram & Co., Baltimore, Md., have issued their catalogue of summer goods. It refers to Water Coolers, Refrigerators, Freezers, Vapor and Gasoline Stoves and a variety of Tinware. It is accompanied by a discount sheet and leaflets calling attention to such specialties as the Gem Apple Corer, Acme Stove-Pipe, Fly Fans, the Favorite Baking Pan, &c.

The American Machine Company, Philadelphia, Pa., for whom John H. Graham & Co. are agents, 113 Chambers street, New York, issue a striking showcard and other advertising matter illustrating their Gem Ice-Cream Freezer, and also a circular setting forth some of the merits possessed by it and their Ice Tools.

The George Worthington Company, Cleveland, Ohio, have issued a convenient spring circular showing an attractive line of seasonable goods, to the display of which more than 50 pages are devoted. Steel goods are naturally given a prominent place, and are followed by Shovels, Spades, Post-Hole Diggers, Floral Sets, Wheelbarrows, Grindstones, Lawn-Mowers, Refrigerators, Bird-Cages, Sheep-Shears, &c. It thus represents, of course, only a small portion of the extensive line carried by the company.

The issue of *Lock and Bell* for the present month contains 24 pages, having been again enlarged, so that it is now just double the size it was when first started, in October, 1887. This expansion is a gratifying evidence of its success, which is based upon the enterprise and skill with which it is made to occupy its field.

T. E. Parker, connected with the *Iron-monger*, of London, England, is at present in this country visiting the various trades of general interest to that journal. He leaves New York to-day (Thursday) for an extended trip, stopping at Philadelphia, Baltimore, Pittsburgh, Cincinnati and St.

Louis, and returning by way of Chicago, Cleveland, Buffalo, Toronto, Montreal, Boston and New Haven. Mr. Parker has resided for some time in South America and South Africa, and is familiar with the requirements of the Hardware trade in those portions of the globe.

E. M. Richardson, Waltham, Mass., in his circular relating to his Shedd's Blind-Fast, calls attention to its special features, and emphasizes the fact that it has a coil spring and is attached by means of a screw, and does not drive into the blind, like others made in imitation of it. The quality of the Fastener is also alluded to.

Richardson Bros., Newark, N. J., have issued a new catalogue bearing date January 1, 1889, in which they represent their well-known line of Saws. In their introductory remarks they state that since their last issue they have greatly increased their facilities by the introduction of new machinery, and refer to the gratifying testimonials which they have received from the trade in regard to the quality of the goods. They also call attention to the excellence of the shipping facilities with which the city of Newark is provided, the rates over leading fast freight lines being the same as from New York. They allude specially to their new Butcher Saws, which are shown on pages 53 to 55, and their patent improved Blade Tightener, the simplicity and efficiency of which is referred to. In addition to their line of Saws the catalogue also represents Scrapers, Plastering and Brick Trowels, Molders' Tools, Cane Knives, Screw-Drivers, &c.

Announcement is made that the firm of Wilcox, Brother & Co., Adrian, Mich., has been dissolved, H. H. Wilcox retiring. Geo. A. Wilcox, Wm. A. Stanford and Wm. S. Wilcox have purchased the entire interest of the late firm, and will conduct the business at the old stand under the firm name of Wilcox Hardware Company.

There has been a consolidation of the Hardware business of Wells-Stone Hardware Company and A. B. Chapin & Co., both of Duluth, Minn., under the name of Chapin-Wells Hardware Company.

Chas. L. Pierce & Co. are representing Hardware manufacturers in San Francisco, Cal., and are, we are advised, at the present time agents for Hubbard & Co., Pittsburgh, Pa., J. F. Wollensak, Chicago, Ill., Burke Mfg. Company, Youngstown, Ohio, James L. Haven Company, Cincinnati, Ohio, and Kline Mfg. Company, Chicago, Ill., and are negotiating with a view to other agencies. Mr. Pierce has been for some time with the John Russell Cutlery Company, having previously been long connected with the A. F. Shapleigh Hardware Company, St. Louis, and is widely known to the trade, and will have their best wishes in this new departure. In connection with their office it is intended to have a collection of catalogues and price-lists of manufacturers, which will be placed at the service of those in the trade desiring to consult them.

C. J. Bailey & Co., 182 Pearl street, Boston, Mass., issue circulars describing their manufactures in the line of Rubber novelties, including principally Brushes, among which is a Dauber which is referred to as having special advantages.

The Hotchkiss and Upson Company, Cleveland, Ohio, issue a circular illustrating their patent Nut-Lock Track Bolt with solid slot. They explain its construction and use, and allude to the advantages possessed by it.

Enterprise Mfg. Company, Philadelphia, Pa., under date 12th inst., issue a circular to the Hardware trade stating that they have procured new molders to take the place of those who struck and are now in position to fill all orders promptly. They

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Total nail production...	7,993,591	8,158,870	8,760,973		

The rapid displacement of Iron Nails by Steel Nails which has been noticed during

the last few years was continued in 1888, about two-thirds of the total production of Cut Nails in that year being made of steel. In 1884 the production of Steel Nails in the United States (including 500 kegs of combined Iron and Steel) was only 393,482 kegs, or 5 per cent. of the total production. In 1885 the production of Steel and combined Iron and Steel Nails was 1,823,127 kegs, or 27 per cent. of the total production. In 1886 the production of Steel Nails alone was 2,968,989 kegs, or 36 per cent. of the total production. In 1887 the quantity of Steel Nails produced exceeded that of Iron Nails, being over 50 per cent. of the total production; and in 1888 the Steel Nails made amounted to over 66 per cent. of the total production. California made 215,000 kegs of combined Iron and Steel Nails in 1888, and Massachusetts made 3577 kegs. We have classed these in the table with Iron Nails.

The leading Cut-Nail producing district of the United States is known as the Wheeling district. It embraces four counties, all bordering on the Ohio River—Ohio and Marshall counties in West Virginia, in which counties all the nail works of the State are located, and Belmont and Jefferson counties across the river in Ohio, the city of Wheeling being near the center of the district. A widely extended section of Central Pennsylvania, embracing 11 counties drained by the Susquehanna River and its branches, has for several years constituted the next most important Cut-Nail district of the country. Many years ago, however, Allegheny County, Pa., was the leading district in the country, but it has now fallen far behind. The following table shows the production in kegs of Iron and Steel Cut Nails in all these districts in the last five years.

Dist.	1884.	1885.	1886.	1887.	1888.
Wheeling...	1,991,570	1,297,136	1,858,551	1,848,116	2,137,845
Central Penn.	1,083,996	1,472,707	1,489,482	1,222,400	1,106,377
Allegheny Co., Pa.	459,512	176,258	121,441	277,410	232,762

The decline in the Wheeling district in 1885 was due to a prolonged strike, which benefited the Central Pennsylvania district.

Miscellaneous Prices.

The Freezers made by the Gooch Freezer Company, Cincinnati, Ohio, are sold at the following discounts:

	Discount.
Peerless.....	60&10 %
Giant.....	60&10 %
Zero.....	65&10 %
Fet.....	65&10 %
Boss.....	65, 10&10 %

The D. M. Steward Mfg. Company, Chattanooga, Tenn., issue circulars relating to their Metal-Workers' Crayons, Rolling-Mill Crayons, &c. These goods, in case lots, are sold at the following prices, subject to a discount of 25 per cent.:

	Per gross.
Metal-Workers' Crayons.....	\$2.50
Rolling-Mill Crayons.....	2.50

On five-case lots or more a special discount is made.

The Gibbs Lawn Rake Company, Canton, Ohio, quote their Lawn Rakes and Post-Hole Diggers at the following prices: Gibbs Lawn Rakes, discount 50 and 15 per cent.; Canton Lawn Rakes, discount 50 and 10 per cent.; Gibbs Post-Hole Diggers, \$30 per dozen, subject to a discount of 50 per cent.; Imperial Post-Hole Diggers, subject to a discount of 45 per cent. The company report that their sales to date are in excess of last season, which, considering the slowness of trade, is regarded as indicating the favor with which they are received by the trade.

The following are the prices of the Economy Ice-Cream Freezer, manufactured by the Kingery Mfg. Company, Cin-

cinnati, Ohio, for whom the Alford & Berkele Company are special agents, 77 Chambers street, New York:

	Per dozen.
2 Quart.....	\$10.56
3 Quart.....	12.60
4 Quart.....	13.80

Referring to the business of the present year, a leading Pittsburgh jobber writes as follows:

Our volume of business the first quarter of 1889 is much larger than it was the corresponding period of last year. Prices are lower than I have ever known them in almost everything in our line of goods. Manufacturers of Nails and many other lines of Hardware can only be running their works at a loss. Even at loss they are obliged to run, for the loss would be great to shut down. Their trade must be held, and idle machinery depreciates as much as that which is worked.

Granite and Agate Ware are still sold to a considerable extent from the old list, the new list not having yet come into general use.

Obituary.

George H. Churchill, of the Hardware firm of Clark, Churchill & Co., Bloomington, Ill., died April 3. He had been sick for a few days, but was not considered dangerously ill until within a few moments of his death. At noon on the preceding Sunday he was taken ill with what the physicians pronounced diphtheria, but though kept from his business he was able to be about the house. He was 37 years of age and was a native of Portland, N. Y., and for six years a resident of Bloomington. He is referred to as among the promising merchants of his city, with many of the qualities that go to make a successful man, and the manner in which he is referred to indicates the esteem in which he was held.

Items.

Morley Bros., East Saginaw, Mich., have issued a large and imposing catalogue representing the varied lines which they are offering as jobbers and manufacturers. It is a volume of more than 1000 pages, clearly printed, well arranged and strongly bound, making a serviceable catalogue which will be appreciated by their customers. The title page is engraved and represents the different buildings occupied by the business of the house, including the stores, factory and warehouse. It is evident that in the arrangement of this volume the effort has been made, and successfully, to secure the display of a large variety of goods in as small a space as is consistent with their suitable representation and the full descriptive matter. It is also to be noticed that the line of goods represented in the volume is very large, including in addition to the regular line of Hardware, Tools, House-Furnishing Goods, &c., a line of Wooden-Ware, Tinware, Harness, Saddlery Hardware and Whips, Paints, Oils, &c., Electrical Supplies, Brushes, Showcases and other goods of interest to the trade. In the department devoted to the goods manufactured by them the Blue Line Lumbering Tools, Ox Yokes, Ox Bows, &c., are given a prominent place, while their Railroad Stepladders are also illustrated and their construction shown. A pleasant effect is produced by the introduction of colored labels, as on Axes, and the bronze finish applied to other goods, thus giving a touch of color, which adds to the attractiveness of the volume. In nearly all cases list prices are given on the goods, the lists being carefully revised up to date. The volume closes with a number of tables in regard to staple goods, giving the weight, number, thickness, &c., and other useful information. It is a valuable addition to the Hardware trade literature.

The Hulbert Fence and Wire Company, St. Louis, Mo., have issued catalogue No. 12 for 1889, and in it show an enlarged

line of Wire Goods, of which illustrations are given with appropriate descriptions and list prices.

The Samuel Winslow Skate Mfg. Company, Worcester, Mass., issue a circular describing the Vineyard Bicycle, of which illustrations are given, with a statement of its special features.

Hubbard & Co., Pittsburgh, Pa., announce that the destruction of their works in Pittsburgh on the 7th inst. will not prevent the prompt execution of orders for Axes and Hoes, provided they are furnished with specifications immediately, the large capacity of their Beaver Falls works having been increased to meet all demands for these lines. On Saws and Shovels they will, however, be temporarily suspended.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., under date April 2, have issued their catalogue No. 102, devoted to goods connected with summer sports. To this interesting line 48 pages are devoted, with copious illustrations and list prices.

C. E. Hudson, Leominster, Mass., advises us that he has recently made arrangements with three large wholesale houses in Canada—Haverhill, Learmont & Co., and Benny, McPherson & Co., of Montreal, and Wood & Leggat, of Hamilton, Ont.—to have the entire sale of his Rocking Table and Little Star Apple Parers in that country the present year, and has already received orders from them for about 1000 dozen machines. He advises us that he will fill no orders from other parties there this season.

R. Hoe & Co., New York, have issued their Saw catalogue for 1889, in which special attention is given to their Chisel-Tooth Saws, the special features of which are illustrated.

"Syracuse and Its Surroundings" is the title of an artistic pamphlet representing that city, its public buildings, principal industries, &c., together with a number of very tasty sketches of scenery in the vicinity. Among the business houses thus represented are the works of E. C. Stearns & Co., the illustration of which indicates their extent and completeness.

The catalogue of Indurated Fibre Ware issued by Cordley & Hayes, 173 and 175 Duane street, New York, gives a description of the various lines, their uses and dimensions, while interesting information is also given in regard to the process of manufacture. Retail prices only are quoted, from which a trade discount of 25 per cent. is given. It is also stated that Pails are now painted to represent the Indurated Fibre Ware, and that other imitations are being put on the market.

Schulte, Lohoff & Co., Evansville, Ind., issue a price list of their line of Edge Tools, including Shingling, Half, Lath, Claw, Solid Steel Shingling and Broad Hatchets, Carpenters' and Ship Carpenters' Adzes, Butchers' Choppers, Kitchen Cleavers' and Carpenters' Pincers, of which they have been manufacturers for two years. They allude to their goods as being in excellent demand and are contemplating the building of a new addition to meet the requirements of their trade. They are now running exclusively on Tools and Steel Castings, which are cast from crucible furnaces.

The Corbin Cabinet Lock Company have on exhibition in their Chicago salesroom, 63 Washington street, a specimen cabinet of post-office boxes, equipped with their new post-office lock. The boxes have a metallic framework in front, of ornamental design. The doors are metal, with a glass inserted in each, to permit the interior to be seen. The locks are very ingeniously constructed,

each lock being of the same pattern, yet each being capable of an arrangement of the tumblers so that no two keys are alike. A master key, to be used by the postmaster alone, will unlock any of the locks from the inside in case a key should be lost and it becomes necessary to reset the lock to a different combination of the tumblers. The keys are small and flat. The cabinet of boxes shown has 26 compartments, and is suited to the requirements of a post office in a town of 300 or 400 inhabitants. The post office at Peoria, Ill., was recently fitted with boxes of this pattern. They have also been put into the post office at Council Bluffs, Iowa. The post offices of Evanston and Lake View, Ill., are now having them put in. A large number of offices in large and small towns in various other parts of the country are using them.

On the 10th inst. what is said to be the longest train of Farming Implements that ever crossed the continent arrived in Chicago from Massillon, Ohio, and left at 10.40 a.m. on a special over the Wisconsin Central Railroad, the destination being Portland, Ore. The train, which consisted of 26 cars, the first 5 of which were equipped with air-brakes, stood in the Forty-eighth street yards, and was admired by the officials of nearly every road centering in Chicago. The value of the Implements, which included 46 Threshers, 32 Farm Engines, and 24 Horse-Powers, is estimated at \$80,000. From the engine to the caboose a long white streamer was stretched, on which was painted in black letters "Russell & Co., Massillon, Ohio. To Russell Farming-Implement Company, Portland, Ore. The longest train of its kind that ever crossed the continent." The train was taken through on passenger time, and was expected to arrive at its destination in a week from its departure from Chicago.

Matthai, Ingram & Co., Baltimore, Md., have issued their catalogue of summer goods. It refers to Water Coolers, Refrigerators, Freezers, Vapor and Gasoline Stoves and a variety of Tinware. It is accompanied by a discount sheet and leaflets calling attention to such specialties as the Gem Apple Corer, Acme Stove-Pipe, Fly Fans, the Favorite Baking Pan, &c.

The American Machine Company, Philadelphia, Pa., for whom John H. Graham & Co. are agents, 113 Chambers street, New York, issue a striking showcard and other advertising matter illustrating their Gem Ice-Cream Freezer, and also a circular setting forth some of the merits possessed by it and their Ice Tools.

The George Worthington Company, Cleveland, Ohio, have issued a convenient spring circular showing an attractive line of seasonable goods, to the display of which more than 50 pages are devoted. Steel goods are naturally given a prominent place, and are followed by Shovels, Spades, Post-Hole Diggers, Floral Sets, Wheelbarrows, Grindstones, Lawn-Mowers, Refrigerators, Bird-Cages, Sheep-Shears, &c. It thus represents, of course, only a small portion of the extensive line carried by the company.

The issue of *Lock and Bell* for the present month contains 24 pages, having been again enlarged, so that it is now just double the size it was when first started, in October, 1887. This expansion is a gratifying evidence of its success, which is based upon the enterprise and skill with which it is made to occupy its field.

T. E. Parker, connected with the *Iron-monger*, of London, England, is at present in this country visiting the various trades of general interest to that journal. He leaves New York to-day (Thursday) for an extended trip, stopping at Philadelphia, Baltimore, Pittsburgh, Cincinnati and St.

Louis, and returning by way of Chicago, Cleveland, Buffalo, Toronto, Montreal, Boston and New Haven. Mr. Parker has resided for some time in South America and South Africa, and is familiar with the requirements of the Hardware trade in those portions of the globe.

E. M. Richardson, Waltham, Mass., in his circular relating to his Shedd's Blind-Fast, calls attention to its special features, and emphasizes the fact that it has a coil spring and is attached by means of a screw, and does not drive into the blind, like others made in imitation of it. The quality of the Fastener is also alluded to.

Richardson Bros., Newark, N. J., have issued a new catalogue bearing date January 1, 1889, in which they represent their well-known line of Saws. In their introductory remarks they state that since their last issue they have greatly increased their facilities by the introduction of new machinery, and refer to the gratifying testimonials which they have received from the trade in regard to the quality of the goods. They also call attention to the excellence of the shipping facilities with which the city of Newark is provided, the rates over leading fast freight lines being the same as from New York. They allude specially to their new Butcher Saws, which are shown on pages 53 to 55, and their patent improved Blade Tightener, the simplicity and efficiency of which is referred to. In addition to their line of Saws the catalogue also represents Scrapers, Plastering and Brick Trowels, Molders' Tools, Cane Knives, Screw-Drivers, &c.

Announcement is made that the firm of Wilcox, Brother & Co., Adrian, Mich., has been dissolved, H. H. Wilcox retiring. Geo. A. Wilcox, Wm. A. Stanford and Wm. S. Wilcox have purchased the entire interest of the late firm, and will conduct the business at the old stand under the firm name of Wilcox Hardware Company.

There has been a consolidation of the Hardware business of Wells-Stone Hardware Company and A. B. Chapin & Co., both of Duluth, Minn., under the name of Chapin-Wells Hardware Company.

Chas. L. Pierce & Co. are representing Hardware manufacturers in San Francisco, Cal., and are, we are advised, at the present time agents for Hubbard & Co., Pittsburgh, Pa., J. F. Wollensak, Chicago, Ill., Burke Mfg. Company, Youngstown, Ohio, James L. Haven Company, Cincinnati, Ohio, and Kline Mfg. Company, Chicago, Ill., and are negotiating with a view to other agencies. Mr. Pierce has been for some time with the John Russell Cutlery Company, having previously been long connected with the A. F. Shapleigh Hardware Company, St. Louis, and is widely known to the trade, and will have their best wishes in this new departure. In connection with their office it is intended to have a collection of catalogues and price-lists of manufacturers, which will be placed at the service of those in the trade desiring to consult them.

C. J. Bailey & Co., 182 Pearl street, Boston, Mass., issue circulars describing their manufactures in the line of Rubber novelties, including principally Brushes, among which is a Dauber which is referred to as having special advantages.

The Hotchkiss and Upson Company, Cleveland, Ohio, issue a circular illustrating their patent Nut-Lock Track Bolt with solid slot. They explain its construction and use, and allude to the advantages possessed by it.

Enterprise Mfg. Company, Philadelphia, Pa., under date 12th inst., issue a circular to the Hardware trade stating that they have procured new molders to take the place of those who struck and are now in position to fill all orders promptly. They

also give the following statement as to the strike and its causes:

Some three months ago a committee of molders informed us we had too many apprentices; that their organization had passed a resolution forbidding them to work in shops where they had more than one apprentice to every eight molders. We gave them to understand we would not be governed by their rules, but proposed to conduct our own business. After fully discussing the subject they decided to continue work, as they claimed, under protest. Last year we made our '87 Lawn Mower, and paid 4½ cents for molding its driving-wheel. This was satisfactory to the men. This year our '89 Lawn Mower was placed on the market, and, as its driving-wheel is lighter, smaller and easier to mold, we offered 4 cents as our price for molding it. A shop committee, who appeared to control the actions of the men, waited upon us and argued that the price was not sufficient, demanding 4½ cents per mold. Two interviews were the result, and we could not agree. We asked them if a good molder could not earn \$4

which, besides the name of the house, date, &c., contains in one corner the following:

NON-OFFICIAL.

This paper is only for the private correspondence of our employes.

It will occur to our readers that there are advantages in this as distinguishing between the personal and business correspondence of their employes.

Arrangement of Stores.

We take pleasure in giving a description of the very complete and well-equipped store of C. F. Ziegler, Junction City, Kan., wholesale and retail dealer in Shelf and Heavy Hardware, Stoves, Tinware, House-

Builders' Hardware, Mechanics' Tools, Guns and Sporting Goods, Pocket and Table Cutlery, Stoves and House-Furnishing Goods and Tin and Sheet Iron on the first floor; Carriages, Buggies, Carts, Phaetons and Wood Mantels on the second floor; the basement is used for duplicate stock of Nails, Grindstones, Steel Goods, Stoves, Building Paper, Heavy Hardware and Wagon-Makers' Supplies. The office, it will be observed, is located in the rear of the store and has an elevation of 8 inches. Referring to the diagram, Fig. 333, it will be observed that Stoves, Tinware, House-Furnishing Goods and Glass occupy one side of the store, while the other side is devoted to Hardware, Tools, &c. The Hardware shelves above the running board are 12 inches deep and below it 24 inches deep.

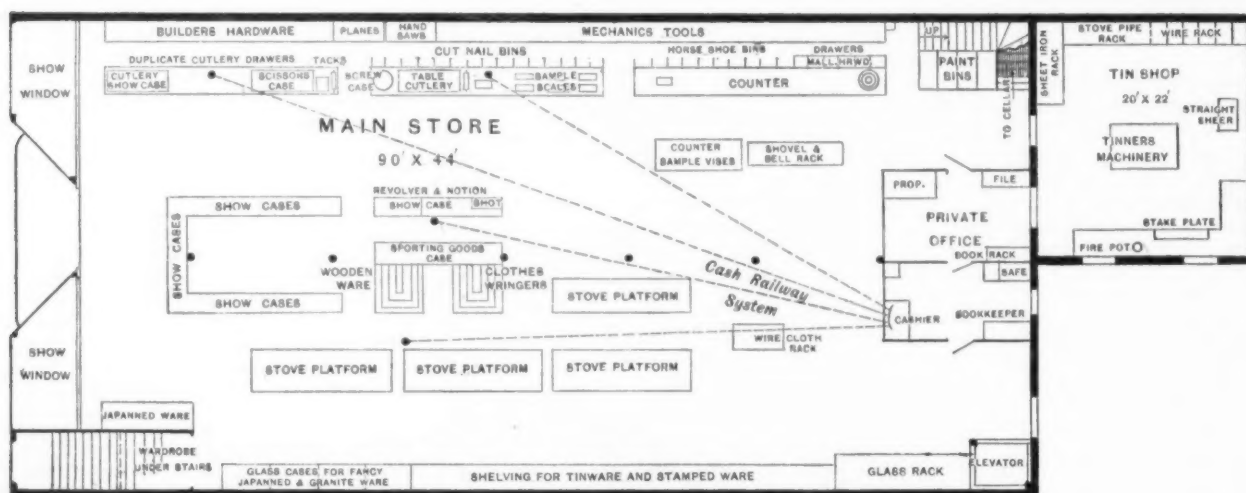


Fig. 333.—Store of C. F. Ziegler, Junction City, Kan.

per day at this price. This they did not care to argue, simply claiming it was a reduction, and they would not stand it. At the conclusion of the second interview the committee told us the men had decided not to accept our price and would strike. This they did, 50 in number, and persuaded 11 apprentices to join them, leaving us with an empty foundry. The next day we started the foundry with five hands, and every day we have added, so that we are now in good working order, and intend hereafter to conduct our own business without any interference from any man or set of men.

The trade will observe on page 50 the announcement in regard to the auction sale of Hardware, 23d and 24th insts., when Haydock & Bissell will offer a large assortment of Shelf Hardware, Table Cutlery, Pocket Knives, Razors, Scissors, Hammers, Hatchets, &c., and other goods in the stock of William Bryce & Co.

Business Methods.

Charles Himrod & Co., of Chicago, have issued a circular of decidedly original design. It consists of a number of leaves of white cardboard very tastefully printed and bound together with a silk cord. The front page bears the mysterious title "A Confession." Turning over the leaves, the following statement catches the eye of the reader: "It would be an evidence of a lack of candor on our part to longer attempt to conceal the facts set forth in the following pages. When such firms as those signing these letters make such statements, there can be no doubt of their correctness, and we feel bound to own right up to the facts as shown." Then come a series of testimonials to the quality of their iron from a number of Chicago foundrymen. Messrs. Himrod & Co. have removed from 115 Dearborn street to the Rookery Building, where they occupy a suit of three rooms on the fifth floor.

A manufacturing house prints paper especially for the use of its employes,

Furnishing Goods, Wood Mantels, Buggies, Carriages, &c., Farm Implements, Paints, Oils and Glass, thus including a stock of wide range. The building, which has recently been erected, is 46 x 100 feet, and has three floors and a basement. The store, a diagram of which is given in Fig. 333, fronts to the east. The front door

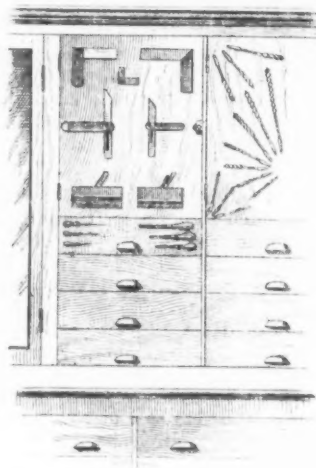


Fig. 334.—Method of Sampling Tools.

measures 8 feet in the clear, and the receiving door in rear of building is 7 feet in the clear. There is also, it will be observed, a rear entrance through the tinshop. The capacious show-windows in the front are 52 inches deep, 15 feet 4 inches wide, making a solid plate glass front, comprised of four lights of glass, each measuring 8 x 11 feet. The departments of the business are as follows:

Above the hanging walk referred to below they are also 24 inches deep. On the south side of the store is shelving 65 feet in length, which is devoted to a variety of Shelf Hardware, including Builders' Hardware, Planes, Tools, &c., which is accommodated by means of a large number of shelf boxes and drawers, the glass showcases containing Tools and other goods being given a prominent place in the shelving. The small drawers containing Builders' Hardware have samples on the front showing the goods they contain and such an arrangement is given as to make a very artistic display. There are two upright glass cases, one of which is used for samples of Bench and Fancy Planes, Plumbs, Levels, Squares, &c., and the other is devoted to Hand, Web, Butcher and Compass Saws. These cases measure 5 feet each. An interesting feature of the display is the manner in which goods are shown on small doors in the shelving, thus representing the stock contained in these cupboards. This arrangement is shown in Fig. 334. It is found that by having these doors closed on the shelving the stock is kept much cleaner than otherwise. Both closets and drawers are devoted to Mechanics' Tools, of which a very large and complete assortment of the best brands is kept. The top shelving above the hanging walk, Fig. 335, is used for the surplus stock of Shelf Hardware. This hanging walk extends around the entire store and is reached by an automatic trap door and stepladder, which is shown in this illustration. This ladder is referred to as much preferable to the ordinary step or hanging ladder, as it is, when not in use, up and out of the way. It will be observed from the illustration that when not in use it draws up under the hanging walk, and by means of the ring fastened to the ladder it is readily pulled down

when wanted, while at the same time it opens the trap door. The weight by which it is operated is entirely out of sight in the rear of the shelving. There is also a cord running from the bottom of ladder through a pulley in the ceiling back of the weight. This device is original with Mr. Ziegler, and is found to be exceedingly convenient

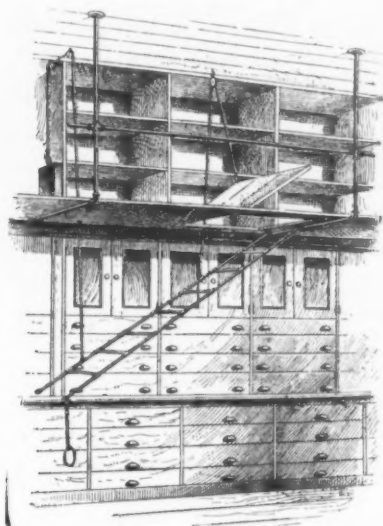


Fig. 335.—Arrangement of Hanging Walk.

and satisfactory. The shelving around the entire store extends from the floor to the ceiling.

It will be observed that in the front of the store opposite the entrance there are some 40 feet of showcases forming three sides of a rectangular parallelogram, which is devoted to Notions, Sporting Goods, Base-Ball Goods, Fishing Tackle, Pocket and Table Cutlery, &c. In the rear of this is the Sporting Department, in which are two pillars which are surmounted by large circles 7 feet in diameter, which are used for suspending Bird Cages, Tin Buckets and Lanterns, thus making a

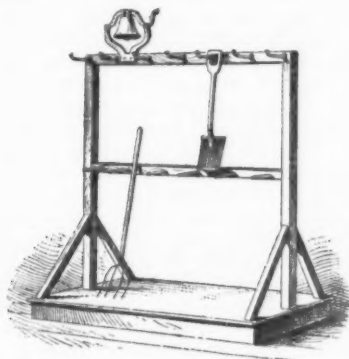


Fig. 336.—Steel Goods and Bell Rack.

good display when properly arranged. Underneath these circles there are smaller ones which are used for Brushes, Tackle Blocks, Steel Traps, Dog and Coil Chain, &c. There are seven of these pillars in the store and each of them is surmounted with such circles.

Toward the rear of the store there are counters with samples of Vises, Wagon Jacks, Lifting Jacks, &c. Next is a Steel Goods and Bell rack, represented in illustration, Fig. 336. Opposite this rack, on the south side, there are bins under counters, in which are kept Wire and Cut Nails, Staples and Horseshoes. Fig. 337 shows some of these bins with the Rope coming through the floor on the end of counter from reels in basement.

In the northeast corner of the store there is shelving for Japanned-Ware, also

a stationary gas pipe which runs up to the hanging walk on the north side of the store. Other details in regard to the arrangement may be gathered from the full and complete diagram, Fig. 333.

In connection with the establishment there is an annex on the opposite side of the street, which has a frontage of 23 x 90 feet, and is used as a sample-room for all kinds of Farm Machinery, Wagons, Wind-mills, &c. In the rear of this room there is another, 23 x 50 feet, used for Bar Iron, Steel, Coil Chain, &c., and back of this a warehouse, 36 x 70 feet, devoted to Farming Implements, Gas-Pipe and Fittings, Pumps, &c., and in connection with this warehouse a farm-wagon shed, 20 x 100 feet.

Improvements in Hibbard, Spencer, Bartlett & Co.'s Stores.

We have previously alluded to the extension of Hibbard, Spencer, Bartlett & Co.'s establishment at Chicago by the addition of the two store buildings adjoining them on the east. These buildings have now been connected with the main business block by the opening of

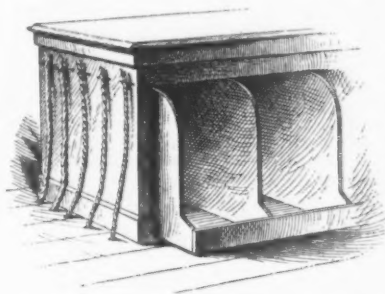


Fig. 337.—Counter with Bins, Rope, &c.

suitable passageways through the partitions on the several floors, and are being rapidly converted to the use of special departments. Each building has a depth of 140 feet, a width of 25 feet and a height of five stories, thus adding immensely to the capacity of this huge Hardware emporium. The room on the ground floor of the first new building to the east, which is No. 20 Lake street, will be used as a sample-room for House-Furnishing Goods. It extends the full depth of the block, and is being handsomely finished on both walls and ceiling. It is the express intention of the firm to make this the finest sample-room for House-Furnishing Goods in the country. The floors above will be devoted to stock. The room on the ground floor in the other new building, No. 18 Lake street, will be used as a sample-room for Lamps and Glassware, not including Crockery. It also extends the full depth of the block, and affords ample room for a magnificent display of goods, now very largely in place and ready for inspection by buyers. The floors above this room are intended for packing and for storing stock.

The Lamp and Glassware department of this house will carry the largest stock in Chicago of either kind of goods. The samples show a bewildering variety of Lamps, Shades, and all the fixtures and appliances pertaining to the Lamp business. All kinds of Lamps are shown, ranging from the plainest and cheapest to the most elaborately decorated and dearest. The stock is one from which a perfect selection can be made to suit any locality and all eccentricities of taste. The Hanging Lamps run from \$1.25 each up to, say, \$30, or as high as any buyer would wish to go. They are resplendent in jewels, prisms, tinted glass shades, decorated shades of delicate or brilliant colors, and most artistic brasswork, some remarkably

fine specimens of *repoussé* work being embraced in the collection. In contradistinction to the policy of other Lamp and Glassware establishments of Chicago, but in harmony with the customs of this house in other departments, no goods are sold at retail, but an exclusively jobbing business is conducted, so that a retail merchant knows here, at least, his customers cannot purchase the special goods they want and at as low prices as himself. Special salesmen are employed for this department, and it is managed by men who thoroughly understand the requirements of this branch of trade. The remarkable success achieved by Hibbard, Spencer, Bartlett & Co. in selling Lamps may be regarded as an indication of the possibilities of this more extended department under the management of trained specialists.

The addition of these two buildings gives the firm more space for their packing department, which had been badly needed. They now have five packing-rooms, each extending the full depth of the block, 140 feet, four of them being 25 feet wide each and one 50 feet wide. In these rooms from 40 to 50 packers are at work all the time, which conveys some idea of the immensity of the business transacted. Several elevators are now in use in the different buildings, each elevator having its special assignment of freight. For instance, some take goods up exclusively, others take goods down only, and others are for the carriage of clerks and passengers generally.

In going through this large business block the visitor is impressed by the methods which have been devised to economize space, as he would naturally suppose that ample room would be found for everything. Shelving is put up in every available quarter in which to show stocks of goods, and bins innumerable extend on every hand. The stock-room for Pieced Tinware, for instance, is quite a curious sight. It is about 14 feet high and 25 feet wide and extends almost the entire depth of the block. On one side of this room a row of bins extends along the partition from the floor to the ceiling 4 feet deep, and on the other side the bins are 10 feet deep, leaving a passageway 11 feet wide between, which about affords room enough for the porters to pass with their trucks bringing in and taking out goods. A force of carpenters is constantly employed in putting up shelving, making and arranging bins, and otherwise reconstructing and repairing.

Incandescent electric lights are used throughout this establishment, so that no matches need to be lighted in any part of it, thus reducing to a minimum the danger of fire, which always accompanies the use of gas.

The rapid filling up of the new additions with samples and packages shows how much the space thus gained was needed. Whether the firm have thus attained their full growth remains to be seen. But as they are constantly increasing and extending their lines and pushing their trade, with the evident determination to keep in the fore-front in the Northwest, the further expansion of their facilities would seem to be predestined.

Exports.

PER BARK E. SUTTON, APRIL 1, 1889, FOR PORT ELIZABETH, SOUTH AFRICA.

By R. W. Forbes & Son.—1 Spring Wagon, 1 set Harness, 1 box Electric Batteries.
By Des Brisson & Allen.—200 Plows and Parts, 10 shovels.
By Carr & Hobson.—7396 pounds Plows and Plow Woods.
By Corner Bros. & Co.—200 Plows, 4½ dozen Clocks, 5½ dozen Brooms.
By Carey, Gale & Lambert.—128 pounds Sash Cord, 6220 pounds Sash Weights.
By A. Field & Co.—7 dozen Rakes, 1500 pounds Nails, 15,000 Cartridges, 24 Blocks, 20 dozen Handles, 6 dozen Braces, 3 dozen Meat Cutters, 36 Scales, 24 Traps, 2 dozen Locks, 15 dozen Axes.
By Arkell & Douglas.—13 cases Handles, 1 bundle Sash Cord, 816 pounds Sash Weights, 1 case

Hardware, 6 Ladders, 1 case Planes, 3 cases Clocks, 1 case Augers, 36 dozen Handles, $\frac{1}{2}$ gross Polish, 1 cask Pumps, 4 bundles Pipe, $\frac{1}{4}$ dozen Trucks, 17,000 Spokes, 1 dozen Rims, 24 dozen Brooms, 2 Washers, 6 dozen Axes, 1 case Hardware, 1 case Hardware.

By *W. H. Crossman & Bro.*—2 dozen Wagons, 2 cases Slates, 1 case Wagon Jacks, 2 dozen Washboards, 15 dozen Brooms, 3 Churns, 5 boxes Clothes Pins, 2 dozen Traps, 1 dozen Scales, 2 dozen Traps, 5 dozen Axes, 1 dozen Saws, 11 cases Plow Parts, $\frac{1}{2}$ dozen Hay Forks, $\frac{1}{4}$ dozen Carriages, 5 cases Sash Weights, 2,000 pounds Nails, 2,553 pounds Barb Wire, 1 dozen Clocks, 6 cases Hardware, 8 dozen pails Axle Grease, 10 Hand Carts, 75 Plow-Wheels.

By *Coombs, Crosby & Eddy.*—24 Plows and Parts, 12 cases Sash Weights, 1 case Sash Cords, 25 dozen Brooms, 9 Pumps, 12 dozen Edge Tools, 22 dozen Axe and Pick Handles, 3 Hay Cutters, 1 dozen Hose Couplings, 112 Plows and Parts, 36 dozen Axe Handles, 5,000 pounds Nails, 50 dozen Edge Tools, 4 barrels Fuse, 40 dozen Edge Tools, 100 Broom Handles, 2 dozen Handles, 52 cases Ladders, 96 Plows and Parts, 60 dozen Axe and Pick Handles, 762 pounds Slate, 70 dozen Edge Tools, 2,500 pounds Nails, 25 boxes Clothes Pins, 2 Wooden Scoops, 20 dozen Edge Tools, 15 Scales, 10 dozen Picks, 96 Plows and Parts, 240 dozen Brooms, 29 pounds Sash Cord, 6 dozen Sash Fasteners, 6 dozen Clocks, 13 dozen Padlocks, 4 dozen Agricultural Hardware, 8 gross Hardware, 1150 pounds Sash Weights, 36 Sewing Machines.

PER BARK BEDFORD, APRIL 3, 1889, FOR BUENOS AYRES, ARGENTINE CONFEDERATION.

By *J. B. Woodward.*—3,000 pounds Wicks, 40 gross Shoe Polish, 100 gross Blacking, 2,000 pounds Shoe Nails, 2,500 pounds Shoe Tacks, 207 Corn Shellers, 801 Plows and Repairs, 10 dozen Axes, 10 dozen Hay Knives, 48 dozen Hat Racks, 36 dozen Bit Braces, 178 dozen Clocks, 2 dozen Washing Machines, 25 Hay Rakes and Repairs, 24 packages Tinners' Tools, 50 dozen Hatchets, 2 dozen Nail Pullers, 440 Sewing Machines and Repairs.

By *Samuel Lees & Co.*—6 cases Pumps, 6 crates Steel Door Mats, 4 cases Grindstones, 2 cases Carpet Sweepers, 2 cases Hardware, 2 cases Fly Fans, 1 case Hatchets.

By *J. Norton & Sons.*—25,000 Carbons, 1,860 pounds Wagons, 30 crates Blacking.

By *J. H. Snyder.*—250 packages Windmill and Tower, 7 Wagons, 22 dozen Hoes and Scrapers, 250 Plows and Cultivators, 60 dozen Axes, 20 Corn Shellers, 12 Churns, 61 Meat Cutters and Stuffers.

By *Pearce & Jones.*—41,000 feet Wire, 4,000 Gun Insulators, 70 coils Wire.

By *Stevens, Corbett & Co.*—1 case Hardware, 12 cases Hardware, 300 pounds Twine, 12 Clocks, 30 cases Iron Nails, 6 Ranges, 2 Wagons, 3 Iron Safes.

By *Healy & Earl.*—80 Horse Rakes, 6 Harrows, 48 Corn Mills and Repairs.

By *Abendroth Bros.*—115 Stoves and Parts.

By *W. Lunham.*—1 Windmill.

By *F. H. Lovell & Co.*—5464 pounds Lamp Goods.

PER BARK ANNIE J. MARSHALL, MARCH 27, 1889, FOR BUENOS AYRES, ARGENTINE CONFEDERATION.

By *John Dunn, Son & Co.*—6 Shellers, 120 Mills, 216 dozen Plow Parts, 386 dozen Plows, 1,500 dozen Lamp-Ware, 56 Mowers, 222 dozen Tools, 200 Clocks, 45 dozen Clocks, 400 dozen Brushes, 100 dozen Wrenches, 1,000 gross Wicks, 4,500 pounds Wicks, 240 gross Clothes Pins, $\frac{1}{4}$ dozen Cutters, 8 dozen Trucks, 12,000 pounds Horse Nails, 100 scales, 150 dozen Handles, 110 dozen Hardware, 37,000 pounds Tacks, 15,000 pounds Shoe Nails, 300 dozen Scales, 10 dozen Beaters, 40 gross Sewing Machine Oil, 5 dozen Stuffers, 20 gross Traps, 200 gross Blacking, 40 dozen Knives, 5 dozen Irons, 300 dozen Forks, 1,000 dozen Slates, 48 Shellers, 50 dozen Saws, 40 dozen Cages, 275 dozen Brushes, 11,000 pounds Shoe Nails, 50 dozen Hammers, 25 Scales, 12 Washing Machines, 15 packages Scales, 400 dozen Hatchets, 100 dozen Handles, 24 dozen Rakes, 30 dozen Hammers, 125 dozen Wheelbarrows, 30 Scales, 3 dozen Wheelbarrows, 50 dozen Scoops, 60 dozen Hat Racks, 8 Corn Mills, 18 Clocks, 277 dozen Tools, 404 dozen Corn Shellers, 106 dozen Washboards, 12 Stoves, 4 dozen Lamp-Ware, 60 Plows, 300 dozen Locks, 447 dozen Edge Tools, 4 dozen Lamp-Ware.

PER BARK H. BREMER, APRIL 6, 1889, FOR PORT NATAL, SOUTH AFRICA.

By *R. W. Cameron & Co.*—75 Plows.

By *New Home Sewing Machine Company.*—51 cases Sewing Machines.

By *Corner Bros. & Co.*—94 packages Hardware, 4 packages Agricultural Implements, 35 packages Hardware.

By *W. H. Crossman & Bro.*—12 cases Plow Parts, 5 cases Plow Parts, 16 cases Hardware, 6 gross Polish, 12 dozen Carpenters' Tools.

By *R. W. Forbes & Son.*—1 case Lamp-Ware, 24 dozen Ladders, 40 dozen Axe Handles, 22 dozen Axes, 20 boxes Scales, 6 dozen Saws, 74 dozen Axes, 12 boxes Wringers, 1 case Toys, 14 boxes Clocks, 3 Mangles, 12 packages Stoves, 162 packages Plows and Parts, 6 packages Corn Shellers, 60 dozen Brooms, 9 packages Churns.

By *Marciel & Co.*—30 dozen Brooms, 500 Handles, 5 dozen Washboards, 5 dozen Washboards, 2 dozen Washboards, 3 dozen Brackets, 16 Corn Shellers, 15 pairs Axes, 4 Corn Shellers, 63 dozen Bolts, 10 dozen Axes, 2 dozen Axes, 7 dozen Wrenches, 6 dozen Hatchets, 39 Pumps, 25 dozen Spade Handles, 31 dozen Axes and Hatchets, 650 pounds Wire Nails, 39 Planes and Levels, 18 dozen Spades, 12 dozen Spades, 39 dozen Locks and Knobs, 13 cases Wheel Parts, 1 dozen Choppers, $\frac{1}{2}$ dozen Tobacco Cutters, 5 cases Irons, 2 Quaker Mills, 2 dozen Mill

Pick Blades, $\frac{1}{4}$ dozen Handles for same, $\frac{1}{4}$ dozen Cages, 10 dozen Hammers, 84 dozen Trowels, 4 dozen Knives, 6 dozen Saws, 10 dozen Saws, 18 dozen Saws, 10 dozen Axes, 6 Boston Trucks, 1000 pounds Horseshoes, 5 dozen Brackets, 12 dozen Can Openers, 44 dozen Bench Vises, 1 gross Carriage Knobs, 3 gross File Handles, 74 dozen Brackets, 6 dozen Chisel Handles, 2 cases Hardware, 1 dozen Hand Screws, 2 dozen Wood Bench Screws, 112 pounds Oil Stone, 1 dozen Charcoal Iron, 32 dozen Lines, 1 case Handles, 1 case Gauges, $\frac{1}{4}$ dozen Axl Hfts, 6 dozen Locks, 2 dozen Axes, 36,500 pounds Nails, 8 Shellers, 4 Shellers.

PER SHIP TROOP, APRIL 8, 1889, FOR MELBOURNE, AUSTRALIA.

By *F. B. Wheeler & Co.*—23 sets Harness, 6 dozen Velocipedes.

By *Winchester Repeating Arms Company.*—18 Guns, 50,000 Primers, 12,000 Loaded Shells, By *Meriden Britannia Company.*—5 packages Plated-Ware, 6 boxes Plated-Ware, 3 boxes Plated-Ware.

By *Simpson, Hall, Miller & Co.*—500 pounds Plated-Ware, 500 pounds Plated-Ware, 750 pounds Plated-Ware.

By *Nerius & Haviland.*—4079 Shade Rollers.

By *A. Field & Co.*—1 case Links, 109 pounds Tacks, 650 dozen Hardware, 146 pounds Paint, 566 pounds Malleable Iron, 26,700 Bolts, 370 dozen Hardware.

By *R. Irwin & Co.*—120 dozen Fruit Jars.

By *Healy & Earl.*—1 case Planing Machine, 8 cases Governor Valves.

By *Welsh & Lea.*—10 cases Axes, 3 cases Handles, 2 packages Meat Choppers.

By *Wheeler & Wilson Mfg. Company.*—302 Sewing Machines.

By *Ansonia Clock Co.*—61 boxes Clocks, 30 boxes Clocks, 56 boxes Clocks, 34 boxes Clocks, 20 Boxes Clocks.

By *Sargent & Co.*—61 cases Hardware, 17 packages Castings, 4 boxes Castings and Bells.

By *White Sewing Machine Company.*—5194 pounds Sewing Machines.

By *Edward Miller & Co.*—40 packages Lamp Goods.

By *Coombs, Crosby & Eddy.*—7 dozen Hammers, 3 dozen Rakes, 24 dozen Wood Handles, 6 dozen Hatchets.

By *U. James.*—2500 pounds Lawn Mowers.

By *W. K. Freeman.*—37 packages Hardware.

By *Singer Mfg. Company.*—977 cases Sewing Machines.

By *H. W. Peabody & Co.*—430 pounds Hammers, 7 cases Agricultural Implements.

By *Arnold, Cheney & Co.*—1 case Malleable Iron, 13 cases Hubs, 5 cases Spokes, 1 case Saddlery, 37 bundles Spokes, 3 cases Whips, 5 cases Iron Velocipedes, 65 cases Handles, 1 case Bolts, 52 cases Handles, 3 cases Bolts, 1 case Bolts, 24 packages Stoves, 21 cases Saws, 81,361 pieces Roofing Slate, 300 boxes Clothes Pins, 9 cases Axes.

By *McLean Bros. & Rigg.*—16 dozen Lamps, 12 dozen Chimneys, 25 dozen Plumbs and Levels, 4 dozen Cork Pullers, 250 feet Rubber Hose, 35 dozen Brackets, 66 dozen Axes, 177 dozen Drills, 2,000 pounds Nails, 39 Refrigerators, 14 packages Lampware, 48 Mouse Traps, 12 dozen Gate Latches, 10 packages Grindstones and Parts.

By *W. H. Crossman & Bro.*—21 dozen Cow Bells, 4 cases Hardware, 3 cases Stone, 2 cases Hardware, 3 dozen Tin Kettles, 1 gross Graters, 2 cases Hardware, 84 dozen Braces, 168 pounds Stone, 9 packages Hardware, 8 cases Hardware, 18 dozen Hammers, 21 gross Whips, 1 bundle Handles, 93 dozen Axes, 24 dozen Hay Forks, 1 gross Graters, 312 dozen Handles, 22 packages Hardware, 33 dozen Axes, 7 dozen Churns, 1 gross Graters, 15 gross Sewing Machine Oil, 1 gross Vegetable Presses, 25 dozen Chimneys, 1 gross Graters, 12,000 Metallic Cartridges, 50 dozen Braces, 32 dozen Axes, 24 dozen Hinges, 5 cases Hardware, 12 dozen Braces, 8 dozen Valves.

By *Arkell & Douglas.*—2 cases Handles, 4 cases Plated-Ware, 2 crates Wheels, 1 bale Rubber, 1174 pounds Wagon Springs, 24 dozen Handles, 94 pairs Shafts, 8 cases Carriage-Ware, 4 dozen Bars, 1 case Thermometers, 5 cases Hardware, 1 case Hubs, 3 cases Spokes, 2 dozen Wagon Jacks, 1 case Bolts, 6 cases Spokes, 1 case Hubs, 10 cases Nails, 1 case Sandpaper, 12 dozen Handles, 3 dozen Axes, 9 Refrigerators, 13 cases Traps, 521 pounds Nails, 8 cases Hardware, 2 cases Forks, 3 cases Hoes, 3 packages Hammocks, 3 cases Blacking, 5 cases Grindstones, 2 gross Machine Oil, 35 cases Hardware, 27 cases Handles, 3 cases Hose, 27 cases Axes, 32 packages Hardware, 5 cases Bolts.

By *R. W. Cameron & Co.*—300 cases Wheels, 2,050 pounds Pumps, 545 pounds Castings, 1700 pounds Sewing Machines, 2887 pounds Castings, 1240 pounds Castings, 1250 pounds Saw Machinery, 430 pounds Carts, 10 cases Sewing Machines and Parts, 21 cases Hardware, 37 bundles Spokes, 3 cases Carriage-Ware, 7 cases Carriage-Ware, 4 boxes Lampware, 1 case Carpet Sweepers.

By *R. W. Forbes & Son.*—3 cases Wringers, 18 dozen Fly Traps, 50 dozen Washers, 2 boxes

Plated-Ware, 1 case Clocks, 80 sets Axes, 34 packages Hardware, 1 gross Harness Oil, 1 case Sandpaper, 2,600 pounds Bolts, 6 gross Fish Lines, 17 packages Fire Arms, 4 gross Sewing Machine Oil, 31 dozen Axes, 30 packages Stoves, 18 packages Hardware, 35 gross Lamp Wicks, 500 Broom Handles, 6 dozen Hoe Handles, 3 packages Plows and Parts, 5 cases Wringers, 9 cases Sad Irons, 46 packages Hardware, 3 packages Toys, 26,920 pounds Barb Wire, 22 cases Wringers, 20 dozen Fork Handles, 5030 pounds Carriage Bolts, 20 dozen Hoes, 6 dozen Rakes, 30 dozen Snaths, 1 case Stencils, 4 cases Wire Goods, 4 packages Agricultural Implements, 4 packages Fire Arms, 5 gross Axle Grease, 5 cases Kitchen Utensils, 4 packages Pails, 18 dozen Hatchets, 2 gross Casters.

By *Strong & Trowbridge.*—1 case Cartridges, and Fire Arms, 14 cases Cartridges, 4 cases Tools, 1 case Nails, 1 case Wire Goods, 1 case Locks, 1 case Pumps, 1 case Mangles, 2 cases Handles, 3 cases Locks, 4 cases Tools, 2 cases Broom Handles, 3 packages Lampware, 3 cases Castings, 2 cases Traps, 30 kegs Nails, 1 case Toys, 3 cases Wringers, 1 case Hardware, 1 case Rivets, 5 cases Hatchets, 50 boxes Clothes Pins, 6 nests Pails, 1 case Hardware, 1 case Sluice Forks, 1 case Lampware, 1 case Locks, &c., 1 case Plated-Ware, 4 cases Choppers, 5 cases Nails.

Spanish Iron Minerals.

It appears that the aggregate exports of iron ore from Bilbao last year amounted to 3,591,637 tons, as compared with 4,170,422 tons in 1887, and 3,160,047 tons in 1886. Of these exports, 2,481,435 tons were forwarded to the United Kingdom last year, as compared with 2,855,667 tons in 1887, and 2,151,137 tons in 1886. The United Kingdom alone absorbed 69 per cent. of last year's exports. Holland took 644,235 tons last year, as compared with 707,394 tons in 1887, and 534,687 tons in 1886. France ranked third with an importation of 347,687 tons last year, as compared with 356,980 tons in 1887, and 332,103 tons in 1886. The only other considerable importer was Belgium, which took 103,602 tons last year, as compared with 98,304 tons in 1887, and 98,442 tons in 1886. It will be seen that while Great Britain took 69 per cent. of the iron minerals exported from Bilbao last year, Belgium hardly took 3 per cent. Of the Spanish iron minerals exported from Bilbao last year to Great Britain, 558,091 tons went to Middlesborough, 476,641 tons to Cardiff, 361,262 tons to Newport, and 236,724 tons to Newcastle-on-Tyne. As regards France, 182,844 tons went to Dunkerque and 92,918 tons to Bayonne. The deliveries of iron minerals coastwise from Bilbao last year were 39,956 tons, as compared with 28,274 tons in 1887, and 25,181 tons in 1886. As regards the local consumption of Spanish iron minerals at Bilbao, it appears that the Vizcaya forges used last year 166,508 tons, the San Francisco del Desierto Works 113,392 tons, and the Bilbao Blast Furnaces Company 134,000 tons, making an aggregate of 413,900 tons. We learn that the ironstone mines of the Bilbao district will have to contend in future against the competition of iron minerals, which have been found to exist in other localities in Spain. The new mines are stated to be richer than those of the Bilbao district, and their minerals further contain an advantageous proportion of manganese.

It is reported that one of the blast furnace companies in the Lehigh Valley has purchased lately 7500 tons of non-Bessemer ore, guaranteed 58 per cent., at \$2.65, f.o.b. Escanaba, and an equal quantity of ore, guaranteed 60 per cent., at \$2.75, f.o.b. same port. The freight from Escanaba to Buffalo is \$1.05, and from Buffalo to the point in the Lehigh Valley, \$1.55, making the cost at furnace, of the 58 per cent. ore, \$5.25, and of the 60 per cent. ore, \$5.30. Foreign 55 per cent. ore has been offered at \$4.85, delivered at furnace.

Daisy Lemon and Lime Squeezer.

This article is put on the market by James D. Frary, Meriden, Conn., and is represented in the accompanying illustration, which indicates the manner of its use. In No. 40 the cup and the cone of the squeezer are coated with an elastic rubber material, and in No. 60 they are tinned. The rubber coating is referred to as very satisfactory for this use, as it is proof against lemon-juice. In using this squeezer it is placed on the top of tumbler or cup, as shown in the illustration, when,

*Daisy Lemon and Lime Squeezer.*

the handle being raised, a half lemon is placed with the left hand on the top of the cone, when the handle is pressed downward with the right hand. The squeezer being then held by the left hand, the juice is extracted readily by means of the pressure and one or two turns of the handle. The thoroughness with which it does its work and the fact that the juice of the lemon is obtained free from seeds and pulp and without soiling the fingers or clothing are points made in regard to this article.

Knife-Balancing Machine.

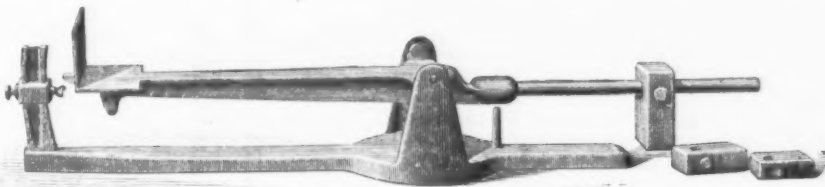
We present in the accompanying engraving a general view of a patent proportional knife-balancing machine manufactured by the Defiance Machine Works, of Defiance, Ohio. This machine is brought out to meet a well-defined want for a machine for perfectly balancing molding knives, planer knives, revolving cutters, knife cap screws, &c. In operating this machine each knife is placed in succession on the platform of the balancing machine with its face toward the end-board, shown at the left of the engraving. At the opposite

end of the beam is placed a suitable weight. If it is found that the knives are of the same specific weight, they are then placed in succession with their backs against the end-board just referred to. If they still appear to be of the same specific weight, they are then placed in succession flatwise on the platform in as many different positions as may be possible. By repeated trials it will thus be ascertained when they are all reduced to the same

and dies are employed in the manufacture, so all the parts are of uniform size and the work and cost of making them very much reduced.

New Twine Box.

We illustrate to-day a new twine box of ingenious pattern that is being put upon the market by the Wire Goods Company, of

*Knife-Balancing Machine.*

weight in their corresponding parts. The balance weights shown at the right in the engraving are made oblong, so that by placing the heavy end up the entire mass, consisting of weight, beam and knife, may be poised near its center of gravity and thus oscillate more sensitively. If, however, the object to be balanced be very heavy the weight must hang down. From an inspection of the engraving it will be seen that the operator can make the poise more or less delicate according to the varied positions of the knives to be balanced.

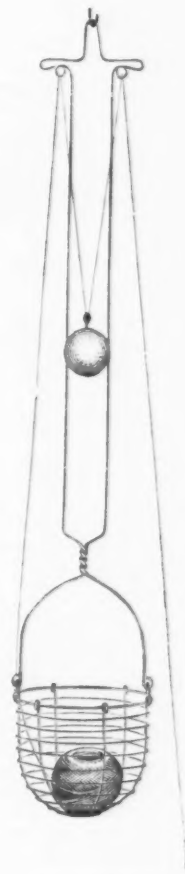
The Perfection Funnel.

A new form of funnel which possesses a number of advantageous features is manufactured by Augustus Gersdorff, proprietor of the Perfection Funnel Works, Bridgeton, N. J. The nozzle of the funnel, is, as will be noticed triangular in section with rounded corners, so that when it rests in the neck of a bottle there is ample space for the escape of the air. By this means the pouring can be done more rapidly, and the liquid is prevented from spilling out of the funnel by an inturned rim or edge. In the construction of the funnel each section is made of one piece of tin without the middle seam, which ordinarily makes a lodgment for dust and dirt and interferes with cleaning. Another feature of these funnels is the use of removable strainers,

*The Perfection Funnel.*

through which the liquid is passed as it enters the bottle. The strainers, having three notches in the edge, are held in position by small lugs formed in the seams of the funnel, and may readily be unseated and removed. The funnels are made of tin or copper tin-lined, and the shape of the pieces from which they are constructed permits the sheet metal to be cut with very little waste. Special presses

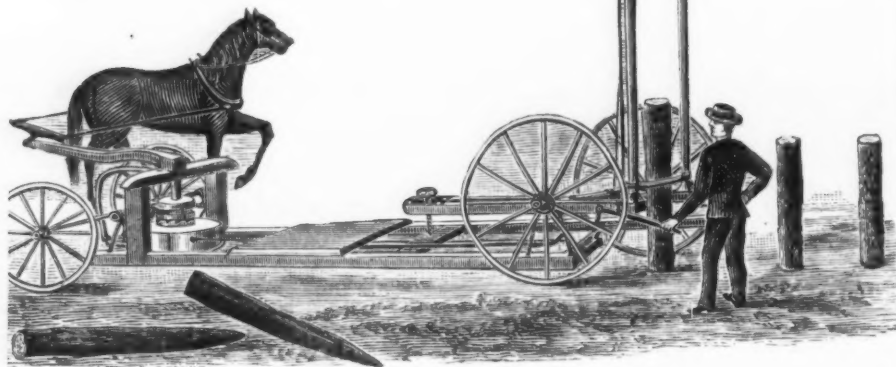
Worcester, Mass. The weight is suspended between two slides and the twine is threaded over it in such a way that as twine is drawn from the box the weight is lifted to the top of the slides. When sufficient string has been used and broken off, so that the twine is released, the

*New Twine Box.*

weight promptly drops to the bottom of the slides, and in doing so takes up the slack of the twine and draws it back to the position from which it started. By this very simple device the annoyance of snarled and unraveled twine is done away with, and the end of the string always hangs at the same point ready for the next one who shall come to use it. The Wire Goods Company announce that they will supply the twine boxes with attachments complete, as per the illustration, or they can supply the attachment separately, to be hung up over any twine box already in use, and to perform the same service that it does in the twine box complete.

Post or Pile Driver.

This machine is intended for light work, such as the driving of posts for wire fencing and the like. It is simple in construction and easily operated, and can be readily moved from place to place. When not in use, the hammer guides fold down and rest parallel with the body of the machine, thereby facilitating transportation. The guides are made of two pieces of pipe united at their upper ends by a yoke, and fastened at their lower ends into shoes hinged to the base. The winding drum is placed vertically at the opposite end of the machine, and the upper end of its shaft is provided with a sweep arm, and at its lower end is furnished with a clutch-ring which may be disengaged from the drum to permit its free turning and the falling of the hammer. The clutch is automatically relieved by a lug projecting in the path of the hammer, which is suitably connected with the clutch. This lug can be placed at any desired height to regulate the stroke of the hammer. This ma-



Automatic Fence-Post Driving Machine.

chine is the invention of Oldham & Roberts, 3849 Finney avenue, St. Louis, Mo., by whom also it is put on the market.

Logan's Patent Stall Drain.

The accompanying illustration represents a stall flooring patented and manufactured by Martin Logan, 164 East Seventy-seventh street, New York. The lower part of the cut given represents the drain as placed in the stall, and the upper part shows the bed plate and slats, which are sold for the use indicated. The bed plate is 19 inches wide, 5 feet long, with gutters 1 inch wide, and is made of cast iron, the wood slats, inserted as indicated, being made of hard oak. The channels between each wooden slat act as independent gutters to carry the refuse off to the main gutter. It will be observed that it is constructed without the use of nails or screws to injure horses, and when the wood slats are worn they can readily be removed and replaced without the aid of a carpenter by lifting up the bed plate and sliding slats in place from the forward end of the plate. The manufacturer also points out the advantage it possesses in having the bed plate of iron, as promoting cleanliness in the stable and preventing soaking and disagreeable smells, and it is claimed that it will afford health and comfort to the horse, and prevent the rise of ammonia from injuring carriages. The slats are 2 inches wide and 2 inches deep, and the whole depth of plate and slat is 2½ inches.

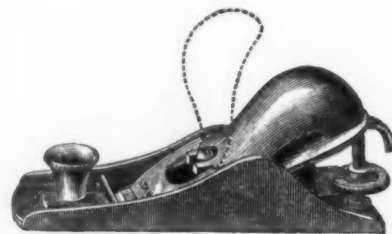
Some time ago we alluded to the alleged records in wire-rod rolling on which English manufacturers seemed to pride themselves. German makers, too, appear to regard their latest mills in the light of advanced practice. As a matter of fact,

American wire-rod mills are greatly ahead of anything that is being done in Europe. At Warrington, England, as we noted some time since, 370 to 400 tons rolled in one week was regarded as good work. In

work, the enormous advance made will be appreciated. If our English and German friends have anything approaching the records alluded to to show American wire-rod makers will be happy to learn of it.

Knuckle-Joint Block Plane.

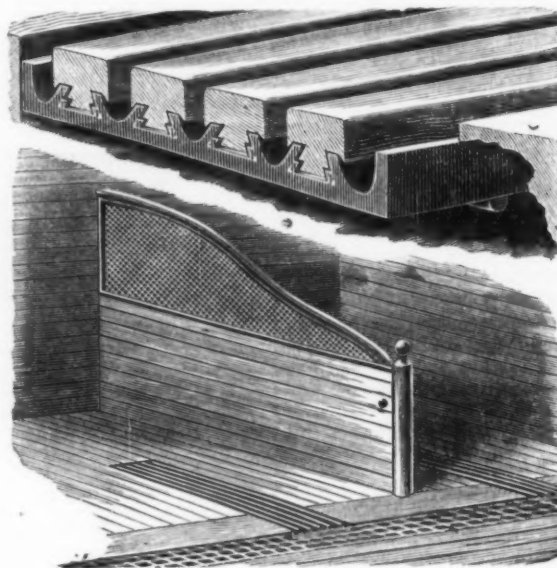
We present in the illustration herewith a general view of a knuckle-joint block plane recently added to the assortment of tools manufactured by the Stanley Rule and Level Company, of New Britain, Conn. By reference to the engraving it will be seen that the method of clamping the cutter in position is by means of a knuckle-joint in the cap above it, which also serves as a convenient hand-rest after the cutter is secured in place. By the use



Knuckle-Joint Block Plane.

of the brass thumb nut at the rear of the plane, the cutter can be set forward or drawn back, as may be desired. The curved lever under the cutter is designed for use in adjusting the cutter sidewise, so that the cutting edge may always be exactly straight with the face of the plane. The device is well made in all respects, and is claimed to be a very convenient tool.

A rigid specification to which steel rail manufacturers point as illustrative of the excessive requirements of some of the railroad companies, was given out lately in connection with bids asked on 1500 tons of 90-pound Reading section steel rails for the Manhattan Elevated Railroad of New York. The specification in question calls for a minimum of 0.45 and a maximum of 0.55 carbon, an analysis to be taken of



Logan's Patent Stall Drain.

have every reason to believe that at no distant date the works now under construction will come up to a rate of output of 100 gross tons per day of 12 hours, and that 1000 tons will soon become an average week's work, running double turn. When it is considered that in 1872 15,000 pounds was regarded as a very good day's

each heat; it calls for a testing of crop ends from each heat by a drop of 2000 pounds falling 18 feet, the permanent set of this being a part of the record. The maximum weight variation is one pound per yard; the rails are to be notched and drilled for the Fisher joint, and no variation above ¼ inch standard length.

CURRENT HARDWARE PRICES.

APRIL 17, 1889.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.—

Caps, Percussion, 1000—	
Hicks & Goldmark's	
F. L. Waterproof, 1-10's.....	50¢
E. B. Trimmed Edge, 1-10's.....	25¢
E. B. Grnd. Edge, Cent. Fire, 1-10's, 70¢	74¢
Double Waterproof, 1-10's.....	\$1.40
Musket Waterproof, 1-10's.....	50¢
C. B. D.....	28¢
S. B.....	30¢
Union Metallic Cartridge Co.	
F. C. Trimmed.....	50¢
F. L. Ground.....	25¢
Cent. Fire Ground.....	70¢
Dbl. Waterproof.....	74¢
Dbl. Waterproof, in 1-10's.....	\$1.40
S. B. Genuine Imp.orted.....	45¢
Eley's E. B.....	54¢
Eley's D Waterproof, Central Fire.....	\$1.60
Cartridges.	
Rim Fire Cartridges.....	50¢
Rim Fire Military.....	15¢
Cent. Fire, Pistol and Rifle.....	15¢
Cent. Fire, Military and Sporting.....	15¢
Blank Cartridges, except 22 and 32 cal., additional 10¢ on above discounts.	
Blank Cartridges, 22 cal., \$1.75.....	2¢
Blank Cartridges, 32 cal., \$3.50.....	2¢
Primed shells and bullets.....	16¢
B. B. Caps, Round Ball, \$1.75.....	2¢
B. B. Caps, Con. Ball, Swgd., \$2.00.....	2¢
Primers—	
Berdan Primers, \$1.00.....	2¢
B. L. Caps (for Sturtevant Shells) \$1.00.....	2¢
All other Primers, \$1.20.....	2¢

Shells—	
First quality, 4, 8, 10 and 12 gauge.....	25¢
First quality, 14, 16 and 20 gauge.....	\$1.10
Star, Club, Rival and Climax brands, 10 and 12 gauge.....	33¢
Club, Rival and Climax brands, 14, 16 and 20 gauge.....	30¢
Seibold's Comb. Shot Shells.....	15¢
Brass Shot Shells, 1st quality.....	60¢
Brass Shot Shells, Club, Rival, Climax.....	65¢
I. X. L., 10 and 12 gauge.....	40¢
"Special," 10 gauge.....	30¢
"Special," 10 and 12 gauge.....	40¢
Fowler's Pat.....	\$3.25

Shells Loaded—	
A. M. Co. List No. 19, 1887.....	20¢
Wads—	
U. M. C. & W. R. A.—B. E., 11 up.....	\$2.00
U. M. C. & W. R. A.—B. E., 9&10.....	2.30
U. M. C. & W. R. A.—B. E., 7&8.....	2.60
U. M. C. & W. R. A.—P. E., 11 up.....	3.10
U. M. C. & W. R. A.—P. E., 9&10.....	4.00
U. M. C. & W. R. A.—P. E., 7&8.....	4.90
Eley's B. E., 11 up.....	\$1.75
Eley's P. E., 11 up.....	2.80

Anvils.—	
Eagle Anvils, 10¢.....	20¢
Peter Wright's.....	94¢
Armstrong's Mouse Hole, Extra 11.....	84¢
Trenton.....	94¢
Wilkinson's.....	94¢
J. & Riley Carr, Pat. Solid.....	11¢
Moore & Barnes Mfg. Co.....	33¢
Anvil Vise and Drill—	
Millers Falls Co., \$18.00.....	20¢
Cheney Anvil and Vise.....	25¢
Allen Anvil and Vise, \$3.00.....	40¢

Apple Parers—	
Advance.....	10¢
Antrim Combination.....	50¢
Baldwin.....	52¢
Champion.....	72¢
Eureka, 1888.....	17¢
Family Bay State.....	12¢
Gem.....	50¢
Gold Medal.....	40¢
Hudson's New '88.....	37¢
Ideal.....	37¢
Improved Bay State.....	30¢
Little Star.....	50¢
Monarch.....	50¢
New Lightning.....	50¢
Orion.....	40¢
Penn.....	40¢
Perfection.....	40¢
Pomona.....	40¢
Rocking Table.....	60¢
Turntable.....	40¢
Victor.....	13.50¢
Waverly.....	40¢
White Mountain.....	40¢
72.....	42¢
76.....	50¢
78.....	60¢

Augers and Bits—

Douglas Mfg. Co.....	
Wm. A. Ives & Co.....	70¢
Humphreysville Mfg. Co.....	
French, Swift & Co. (F. H. Beecher), Cook's, Douglas Mfg. Co.....	55¢
Cook's, N. H. Copper Co. 50¢10¢50¢10¢55¢	
Ives' Circular Lip.....	30¢
Patent Solid Head.....	40¢
C. E. Jennings & Co., No. 10, extension lip.....	40¢
C. E. Jennings & Co., No. 30.....	60¢
C. E. Jennings & Co., Auger Bits, 1/2 set, 32 3/4 quaters, No. 5, 6; No. 30, \$3.50, 39¢	
Lewis Patent Single Twist.....	25¢
Jennings' Augers and Bits.....	60¢
Imitation Jennings' Bits.....	20¢
ugh's Black.....	50¢
Car Bits.....	15¢
L. Hommedieu Car Bits.....	15¢
Forstner Pat. Aug. Bits.....	10¢

Hollow Augers—

Ives'.....	25¢
French, Swift & Co.....	25¢
Douglas.....	40¢
Bonney's Adjustable, 1/2 doz \$48.....	20¢
Stearns'.....	20¢
Ives' Expansive, each \$4.50.....	50¢
Universal Expansive, each \$4.50.....	20¢
Wood's.....	25¢

Expansive Bits—

Clarks' small, \$18; large, \$26.....	35¢
Ives' No. 4, 1/2 doz \$60.....	40¢
Swan's.....	40¢
Stearns' No. 1, \$20; No. 2, \$22.....	35¢
Stearns' No. 2, \$48.....	20¢

Gimlet Bits—

Common.....	25¢
Diamond.....	25¢
Bee.....	25¢
Double Cut, Shepardson's.....	45¢
Double Cut, Ct. Valley Mfg. Co.....	30¢
Double Cut, Hartwell's, 1/2 doz.....	55¢
Double Cut, Douglas's.....	40¢
Double Cut, Ives'.....	60¢

Bit Stock Drills—

Morse Twist Drills.....	50¢
Standard.....	50¢
Cleveland.....	50¢
Syracuse, for metal.....	50¢
Syracuse, for wood (wood list), 30¢30¢55¢	
Williams' or Holt's, for metal, 50¢10¢10¢	
Williams' or Holt's, for wood.....	40¢

Ship Augers and Bits—

L'Honniedieu's.....	15¢
Watrous'.....	15¢
Snell's.....	15¢
Snell's Ship Auger Pat'n Car Bits, 15¢10¢15¢10¢55¢	

Awl Hafts—

Sewing, Brass Fer. 1/2 gr, \$3.50.....	45¢
Pat. Sewing, Short, \$1.00 1/2 doz.....	40¢
Pat. Sewing, Long.....	12¢
Pat. Peg, Plain Top, 1/2 gr \$10.00.....	45¢
Pat. Peg, Leather Top, 1/2 gr \$12.00.....	45¢

Awls, Brad Sets, &c—

Awls, Sewing, Common, 1/2 gr \$1.70, 35¢	
Awls, Should. Peg, 1/2 gr \$2.45, 40¢40¢10¢	
Awls, Pat. Peg, 1/2 gr \$2.45, 40¢40¢10¢	
Awls, Shouldered Brad, 2-70 1/2 gr.....	35¢
Awls, Handled Brad.....	45¢
Awls, Handled Scratch 1/2 gr, \$7.50, 35¢10¢	
Awls, Socket Scratch, 1/2 doz, \$1.50, 25¢30¢	

Awl and Tool Sets—

Alken's Sets, Awls and Tools, No. 20, 1/2 doz \$10.00.....	55¢
Fray's Adj. Tool Hdls., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9.....	25¢
Miller's Falls Adj. Tool Hdls., Nos. 1, \$12; 2, \$18.....	25¢
Henry's Combination Haft, 1/2 doz \$4.50	
Brad Sets, No. 42, \$10.50; No. 43, \$12.50, 70¢10¢55¢	
Stanley's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.....	30¢

Axes—

Makers' and Special Brands—	
First quality.....	60¢
Others.....	55¢

Axle Grease—

Fraser's.....	4¢
Fraser's, in boxes.....	85¢
Dixon's Everlasting, in bxs., 1/2 doz 1 lb.....	12¢
Dixon's Everlasting, 10-b pails, ea. 85¢	
Lower grades, special brands.....	70¢

Axles—

No. 1.....	4¢
Nos. 7 to 14.....	55¢
No. 15 to 18.....	47¢
Nos. 19 to 22.....	70¢
National Tubular Self-Oiling Standard Farm (1 to 5) and Special Farm (A1 to A5).....	33¢
Over 10 sets.....	33¢

Bag Holders—

Sprengle's Pat.....	18¢
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Balances—

Spring Balances.....	50¢
Common 24.....	15¢
Chatillon's Spring Balances.....	50¢
Chatillon's Circular Spring Balances.....	60¢

Bells—

Hand—

Light Brass.....	70¢
White Metal.....	60¢
Silver Chime.....	33¢
Globe (Cone's Patent).....	25¢

Door—

Gong, Abbe's.....	33¢
Gong, Yankee.....	45¢
Gong, Barton's.....	40¢
Crank, Taylor's.....	25¢
Crank, Brooks.....	50¢
Crank, Cone's.....	10¢

Crank, Connel's.....	20¢
Lever, Sargent's.....	60¢
Lever, Taylor's Bronzed or Plated.....	25¢
Lever, Taylor's Japanned.....	25¢
Lever, R. E. M. Co.'s.....	50¢
Pull, Brook's.....	50¢
Pull, Western.....	25¢

Cole—

Common Wrought.....	60¢
Western.....	20¢
Western, Sargent's list.....	70¢
Kentucky, "Star".....	20¢
Dodge, Genuine Kentucky.....	70¢
Texas Star.....	50¢
Call.....	40¢
Farm Bells.....	3¢
Steel Alloy Church and School Bells.....	40¢

Bellows—

Blacksmith's.....	50¢
Molders'.....	40¢
Hand Bellows.....	40¢

Belted, Rubber—

Common Standard.....	70¢
Standard.....	70¢
Extra.....	60¢
N. Y. B. & P. Co., Carbon.....	60¢
N. Y. B. & P. Co., Diamond.....	60¢

Bench Stops—

Morrill's.....	10¢
Hotchkiss's.....	10¢
Weston's, No. 1, \$10; No. 2, \$9.50.....	10¢
McGill's.....	10¢

Bits—

Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.	
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Bit Holders—

Extension, Barber's, 1/2 doz \$15.00.....	40¢
Ives, 1/2 doz \$20.00.....	60¢
Diamond.....	50¢
Angular.....	10¢

Blind Adjusters—

Domestic.....	30¢
Excelsior.....	10¢
Washburn's Self-Locking.....	20¢

Blind Fasteners—

Mackrell's, 1/2 doz.....	20¢
Van Sand's Screw Pat., \$15 1/2 gr.....	60¢
Van Sand's Old Pat., \$15.00 1/2 gr.....	55¢
Washburn's Old Pattern.....	50¢
Merriman's.....	50¢
Austin & Eddy No. 2008.....	80¢
Security Gravity.....	90¢

Blind Staples—

Barbed, 1/2 in. and larger.....	75¢
Barbed, 3/4 in.....	85¢

Blocks—

Cleveland Block Co., Mal. Iron.....	50¢
Moore's Novelty, Mal. Iron.....	50¢

Bolts—

Door and Shutter—

Cast Iron Barrel, Square, &c.....	70¢
Cast Iron Shutter Bolts.....	70¢
Cast Iron Churn (Sargent's list).....	65¢
Ives' Patent Door Bolts.....	60¢
Wrought Barrel.....	70¢
Wrought Square.....	70¢
Wrt Shutter, all Iron, Stanley's.....	60¢
Wrt Shutter, Brass Knob.....	40¢
Wrt Shutter, Sargent's list.....	60¢
Wrt Sunk Flush, Sargent's list.....	55¢
Wrt Sunk Flush, Stanley's list.....	50¢
Wrt B.K. Flush, Com'n.....	55¢

Carriage, Machine, &c.—

Com. list June 10, '84.....	75¢
Genuine Eagle, list Oct. '84.....	75¢
Phila. pattern, list Oct. '84.....	75¢
R.B. & W., old list.....	75¢
Machine, according to size.....	75¢
Bolt Ends, according to size.....	75¢

Tire—

Common, list Feb. 28, '83.....	70¢
Port Chester Bolt and Nut Company.....	
Empire, list Feb. 28, '83.....	70¢
Phila., list Oct. '84.....	82¢
Keystone, Philadel., list Oct. '84.....	80¢
Norway, Phila., list Oct. '84.....	75¢
American Screw Company.....	
Norway, Phila., list Oct. 16, '84.....	75¢
Eagle, Phila., list Oct. 16, '84.....	80¢
Philadel., list Oct. 16, '84.....	82¢
Bay State, list Feb. 28, '83.....	70¢
R.B. & W., Philadel., list Oct. 16, '84.....	82¢

Stove and Plow—

Stove.....	65¢
Plow.....	60¢
R. B. & W., Plow.....	55¢

Borax—

Without Upright. Angular.....	50¢
Douglas.....	50¢
Snell's, Rice's Pat. 5.50.....	67.5¢
Jennings.....	5.50
Other Machine.....	2.30
Phillips' Patent with Augers.....	7.00

Boring Machines—

Without Upright. Angular.....	50¢
Douglas.....	50¢
Snell's, Rice's Pat. 5.50.....	67.5¢
Jennings.....	5.50
Other Machine.....	2.30
Phillips' Patent with Augers.....	7.00

Bow Pins—

Humason, Beckley & Co.'s.....	60¢
Sargent & Co.'s.....	10¢
Peck, Stow & W. Co.....	50¢

Braces—

Barber's, Nos. 10 to 16.....	50¢
Nos. 30 to 33.....	50¢
Nos. 40 to 63.....	50¢
Barker's, Nos. 8, 10 and 12.....	75¢
Plated, Nos. 8, 10 and 12.....	65¢
Osgood's Ratchet.....	40¢
Spofford's.....	50¢
Ives' New Haven Novelty.....	70¢
New Haven Ratchet.....	60¢
Barber Ratchet.....	60¢
Barbers.....	60¢
Spofford.....	60¢
Common Ball, American.....	11¢
Bartholomew's.....	11¢
Nos. 25, 27 and 30.....	50¢
Nos. 117, 118, 119.....	70¢
Amidon's, Barker's Imp'd Plain.....	75¢
Barker's Imp. Nickeled.....	85¢
Ratchet.....	75¢
Eclipse Ratchet.....	60¢
Globe Jawed.....	40¢
Corner Brace.....	40¢
Universal, 8 in., \$2.10; 10 in.....	\$2.25
Buffalo Ball.....	\$1.10
P. S. & W.....	50¢

Brackets—

Shelf plain, Sargent's list, 55¢10¢55¢
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Cross-Cut Saw Handles—
 Atkins' No. 1 Loop, pair, 30¢; No. 3, 22¢; No. 2 and No. 4 Reversible, 22¢.
 Boynton's Loop Saw Handles, 50¢. 40¢
 Champion.....15¢

Hangers—

Barn Door, old patterns.....60¢10¢10¢70¢
 Barn Door, New England.....60¢10¢10¢70¢
 Samson Steel Anti-Friction.....55¢
 Orleans Steel.....55¢
 Hamilton Wrought Wood Track.....55¢
 U. S. Wood Track.....55¢
 Champion.....60¢10¢
 Rider and Wooster, Medina Yig. Co.'s
 list.....70¢
 Climax Anti-Friction.....90¢
 Climax Anti-Friction for Wood Track.....55¢
 Zenith for Wood Track.....55¢
 Reed's Steel Arm.....50¢
 Challenge, Barn Door.....50¢
 Sterling's Imp'vd (Anti-Friction) 65¢10¢
 Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.
 Cheritree.....50¢10¢
 Kidder's.....50¢10¢60¢
 The Boss.....60¢10¢
 Best Anti-Friction.....60¢10¢
 Duplex (Wood Track).....60¢10¢55¢
 Terry's Pat., 4 in. 10¢; 5 in. 12¢.
 Cronk's Pat., No. 4, \$12.00; No. 5, \$14.40;
 No. 6, \$18.00.
 Wood Track Iron Clad, 4 ft. 10¢.

Carrier Steel Anti-Friction.....60¢50¢55¢
 Architect, set \$6.00.....20¢10¢
 Eclipse.....20¢10¢
 Fellix, set \$4.50.....20¢
 Richards.....30¢30¢10¢
 Lane's Steel Anti-Friction.....40¢10¢
 Ball Bearing Door Hanger.....30¢10¢25¢10¢
 Warner's Pat.....20¢20¢10¢
 Stearns' Anti-Friction.....20¢20¢10¢
 Stearns' Challenge.....25¢10¢25¢10¢10¢
 Faultless.....40¢40¢55¢
 American, set \$6.00.....20¢10¢
 Rider & Wooster, No. 1, 62¢; No. 2, 75¢.
 Paragon, Nos. 1, 2 and 3.....40¢10¢
 Paragon, Nos. 5, 6, 7 and 8.....20¢10¢
 Crescent.....60¢60¢10¢
 Nickel, Cast Iron.....50¢
 Nickel, Malleable Iron and Steel.....40¢
 Scranton Anti-Friction Single Strap.....35¢
 Scranton Anti-Friction Double Strap.....40¢
 Universal Anti-Friction.....40¢
 Wild West, 4 in. Wheel, \$15.00; 5 in. Wheel, \$21.00.
 Star.....40¢10¢40¢55¢
 May.....50¢40¢50¢10¢
 Barry, \$6.00.....40¢10¢

Harness Snaps—

See Snaps.

Hatchets—

List Jan. 1, 1888.
 Isalah Blood.....35¢40¢
 Hunt's Shingling, Lath and Claw.....40¢55¢
 Hunt's Broad.....40¢
 Buffalo Hammer Co.....40¢10¢50¢
 Hurd's.....40¢10¢50¢
 Fayette R. Plumb.....40¢10¢50¢
 Wm. Mann, Jr., & Co.....50¢50¢10¢
 Underhill Edge Tool Co.....40¢50¢10¢
 Underhill's, Haines and Bright.....35¢
 C. Hammond & Son.....40¢10¢50¢
 Simmons.....40¢10¢50¢
 Peck's.....40¢10¢40¢55¢
 Kelly's.....50¢50¢50¢
 Sargent & Co.....50¢
 Ten Eyck Edge Tool Co.....40¢10¢40¢10¢55¢
 Collins.....10¢
 Schulte, Lohoff & Co.....5¢50¢55¢

Hay and Straw Knives—

Lightning, Mrs. price \$18.00, 25¢
 But jobbers frequently give extra.
 Gem.....\$10
 Wadsworth's.....40¢75¢10¢10¢
 Carter's Needle.....\$11.50¢10¢
 Heath's.....\$13.50¢14.00¢
 Auburn Hay, Com. and Spear Point.....50¢
 Auburn, Straw.....40¢
 Nollin's Hay.....\$10.00

Hinges—

Wrought Iron Hinges
 Strap and T.....75¢5¢75¢10¢
 Screw Hook and Strap.....3¢
 14 to 20 in., 3¢; 22 to 30 in., 3¢
 4 to 12 in., 3¢; 14 to 20 in., 3¢
 Heavy Welded Hook.....3¢
 22 to 30 in., 3¢; 24 to 36 in., 2¢
 Screw Hook.....1¢
 and Eye.....\$1.50
 Rolled Blind Hinges, Nos. 32 and 34.....50¢10¢
 Rolled Blind Hinges, Nos. 232 and 234.....55¢10¢
 Rolled Plate.....70¢10¢
 Rolled Rais.....70¢10¢
 Plate Hinges, 8, 10 and 12 in., 5¢
 "Providence" over 12 in., 5¢
Spring Hinges—
 Geer's Spring and Blank Butts.....40¢
 Union Spring Hinge Co.'s list, March, 1888.....20¢
 Acme and U. S.....30¢
 Empire and Crown.....20¢
 Hero and Monarch.....50¢
 American, Gem, and Star, Japanned.....20¢
 American, Gem, and Star, Bronzed.....20¢
 Oxford, Bronze and Brass.....20¢
 Barker's Double Acting.....20¢10¢
 Union Mfg. Co.....25¢
 Bonner's.....30¢
 Buckman's.....15¢20¢
 Chicago.....30¢
 Wiles.....10¢
 Devore's.....40¢
 Rex.....40¢
 Royal.....60¢
 Reliable.....60¢
 Champion.....60¢

Gate Hinges—

Western.....\$4.40, 80¢
 N. E. Reversible.....\$7.50, 55¢
 N. E. Reversible.....\$5.20, 55¢10¢
 Clark's, Nos. 1, 2, 3.....90¢10¢55¢
 N. Y. State.....\$5.00, 55¢10¢
 Automatic.....\$12.50, 50¢
 Common Sense.....\$4.50, 50¢
 Seymour's.....45¢10¢
 Shepherd's.....60¢45¢
 Reed's Latch and Hinges.....\$12.00, 50¢

Blind Hinges—

Parker.....75¢25¢
 Palmer.....50¢45¢10¢
 Seymour.....75¢10¢
 Nicholson.....45¢10¢
 Huffer.....50¢

Clark's, Nos. 1, 3, 5, 40 and 50.....75¢10¢50¢80¢

Clark's Mortise Gravity.....50¢
 Sargent's, Nos. 1, 3, 5, 11, 13.....75¢10¢75¢10¢55¢
 Sargent's, No. 12.....75¢10¢75¢10¢55¢
 Reading's Gravity.....75¢10¢75¢10¢55¢
 Shepard's.....75¢10¢55¢
 Noisless.....75¢10¢55¢
 Niagara.....80¢25¢
 Buffalo.....80¢55¢
 Clark's Genuine Pat.....80¢55¢
 O. S. Lull & Porter.....75¢10¢
 Acme, Lull & Porter.....75¢55¢
 Queen City Reversible.....75¢
 Clark's Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3.....75¢10¢25¢
 North's Automatic Blind Fixtures, No. 2, for Wood, \$10.50; No. 3, for Brick, \$13.50.....25¢25¢

Hoes—

Handled—

Garden, Mortar, &c.....65¢
 Planter's, Cotton, &c.....65¢
 Warren Hoe.....60¢
 Magle.....\$4.00
Eye—
 D. & H. Scovill.....20¢
 Lane's Crescent Planter's Pattern.....45¢55¢
 Drake's Razor Blade, Scovill Pattern.....30¢
 Maynard, S. & O. Pat.....55¢60¢
 Sandusky Tool Co., S. & O. Pat.....60¢
 Hubbard & Co., S. & O. Pat.....60¢
 Chattanooga Tool Co., S. & O. Pat.....60¢
 Grub.....60¢60¢10¢

Hog Rings and Rings—

Hill's Improved Rings.....\$4.25
 Hill's Old Style Rings.....\$2.75
 Hill's Tongs.....\$4.50
 Hill's Rings.....\$2.15¢2.25¢
 Perfect Rings.....\$2.15¢2.25¢
 Perfect Rings.....\$2.15¢2.25¢
 Blair's Hog Rings.....\$2.25¢2.50¢
 Blair's Hog Rings.....\$2.25¢2.50¢
 Champion Rings, Double.....\$2.25¢
 Champion Rings.....\$2.25¢
 Brown's Rings.....\$1.25¢1.30¢

Hoisting Apparatus—

Moore's Hand Hoist, with Lock.....20¢
 Moore's Differential Pulley Block.....40¢
 Energy Mfg. Co.'s.....25¢

Holders, File and Tool—

Balz Pat.....\$4.00, 25¢
 Nicholson File Holders.....20¢

Hollow-Ware—

Iron—

Stove Hollow-Ware—
 Ground.....60¢60¢55¢
 Unground.....60¢10¢60¢10¢10¢
 Enamelled Hollow-Ware—
 Malt Kettles.....65¢10¢
 Boilers and Saucepans.....40¢55¢
 Tinned Boilers and Saucepans.....40¢
 Gray Enamelled-Ware—
 Stove.....50¢50¢55¢
 Maslin Kettles.....60¢10¢60¢10¢10¢
 Boilers and Saucepans.....40¢55¢
 Agate and Granite Ware, old list.....25¢
 Rustless Hollow-Ware.....50¢50¢55¢
 Galvanized Tea-Kettles—
 Inch.....6 7 8 9
 Each.....55¢ 60¢ 65¢ 75¢

Silver Plated—

4 mo. or 5 ¢ cash in 30 days.
 Reed & Barton.....40¢55¢
 Meriden Britannia Co.....40¢55¢
 Simpson, Hall, Miller & Co.....40¢55¢
 Rogers & Brother.....40¢55¢
 Hartford Silver Plate Co.....40¢55¢
 William Rogers Mfg. Co.....40¢55¢

Hooks—

Cast Iron—

Bird Cage, Sargent's list.....60¢10¢10¢
 Bird Cage, Reading.....60¢10¢10¢
 Clothes Line, Sargent's list.....60¢10¢10¢
 Clothes Line, Reading list.....60¢10¢60¢10¢10¢
 Ceiling, Sargent's list.....55¢10¢10¢
 Harness, Reading list.....55¢10¢55¢10¢10¢
 Coat and Hat, Sargent's list.....55¢10¢60¢10¢
 Coat and Hat, Reading.....50¢10¢50¢10¢10¢

Wrought Iron—

Cotton.....\$1.25
 Cotton Pat. (N.Y. Mallet & Handle Wks.).....30¢
 Tassel and Picture (T. & S. Mfg. Co.).....50¢
 Wrought Staples, &c.....See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1888.....45¢
 Wire Coat and Hat, Miles, list April, 1888.....45¢
 Indestructible Coat and Hat.....45¢
 Wire Coat and Hat, Standard.....45¢
 Belt.....75¢10¢80¢

Miscellaneous.

Grass, No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50
 Nollin's Grass.....\$5.00
 Bush.....55¢60¢
 Whitetree-Patent.....55¢
 Hooks and Eyes—Malleable Iron.....70¢70¢10¢
 Fish Hooks, American.....50¢
 Bench Hooks.....See Bench Stops.

Horse Nails—

Nos. 6 7 8 9 10
 Ausable.....25¢25¢25¢24¢23¢
 Clinton, Fin. 24¢ 22¢ 21¢ 20¢ 19¢
 Essex.....25¢25¢25¢24¢23¢
 Lyra.....25¢23¢22¢21¢20¢
 Snowden.....25¢23¢22¢21¢20¢
 Putnam.....23¢21¢20¢19¢18¢
 Vulcan.....23¢21¢20¢19¢18¢12¢5¢
 Northwest'n.....25¢23¢22¢21¢20¢
 Globe.....23¢21¢20¢19¢18¢20¢21¢
 Boston.....23¢21¢20¢19¢18¢20¢21¢
 A. C.....25¢23¢22¢21¢20¢
 C. B. K.....25¢23¢22¢21¢20¢
 Champlain.....25¢23¢25¢24¢23¢

New Haven.....25¢26¢25¢24¢23¢

Saranac.....23¢21¢20¢19¢18¢30¢10¢
 Champion.....25¢23¢22¢21¢20¢

Capewell.....25¢26¢25¢24¢23¢

Star.....23¢21¢20¢19¢18¢

Anchor.....23¢21¢20¢19¢18¢35¢
 Western.....23¢21¢20¢19¢18¢40¢10¢
 Empire Bronzed.....14¢10¢

Horse Shoes—See Shoes Horse.

Hose, Rubber—

Competition.....75¢10¢75¢10¢55¢
 Standard.....70¢70¢10¢
 Extra.....60¢60¢10¢
 N. Y. B. & P. Co., Para.....30¢10¢
 N. Y. B. & P. Co., Extra.....50¢
 N. Y. B. & P. Co., Dundee.....60¢10¢55¢

Huskers—

Blair's Adjustable.....\$8.00
 Blair's Adjustable Clipper.....\$7.00

Indurated Fiber-Ware.

Spittoons, No. 2, 2 doz.....\$6.75
 Basins, Ringed, 2 doz., No. 1, \$3.70;
 No. 2, \$3.10; No. 3.....\$2.70
 Washbuds, Nested, Nos. 0, 1, 2 and 3 (4
 pieces), 2 doz. nests.....\$16.87
 Keelers, Nested, Nos. 1, 2, 3 and 4 (4
 pieces), 2 doz. nests.....\$8.37
 Butter Bowls, 10 and 19-inch (3
 pieces), 2 doz. nests.....\$6.75
 Liquid Measures, pt., qt., 2 qt. and fun-
 nell (4 pieces) set.....\$3.00
 Dry Measures, 1, 2, 4, 8 and 16 qts. (5
 pieces), set.....\$2.25
 See also Patls.

Jack Screws—

See Screws.

Kettles—

Spun. Stamped.
 Brass, 7 to 17 in., 24¢ 21¢
 Brass larger than 17 in., 26¢ 23¢
 Enamelled and Tea Kettles.....See Hollow-Ware.

Keys—

Lock Ass'n list Dec. 30, 1888.....50¢10¢
 Eagle, Cabinet, &c.....33¢25¢
 Hotchkiss' Brass Blanks.....40¢
 Hotchkiss, Copper and Tinned.....35¢
 Hotchkiss' Pat. and Cab.....40¢
 Ratchet Bed Keys.....\$4.00, 15¢
 Wollensak Tinned.....50¢10¢

Knife Sharpeners—

Parkin's.....
 Applewood Handles.....\$2.00, 40¢
 Rosewood or Cocobolo.....\$2.00, 40¢

Knives—

Wilson's Butcher Knives.....25¢30¢
 Ames' Butcher Knives.....25¢
 Foster Bros' Butcher, &c.....40¢
 Nichols' Butcher Knives.....40¢10¢
 Ames' Shoe Knives.....20¢25¢
 Ames' Bread Knives.....\$2.00, 15¢20¢
 Moran's Shoe and Bread.....20¢
 Hay and Straw.....See Hay Knives.
 Table and Pocket.....See Cutlery.
 Corn, Auburn Mfg. Co. Western Pat.....\$2.00
 Corn, Auburn Mfg. Co. Crescent.....\$3.50

Knobs—

Door Mineral.....65¢68¢
 Door Por. Jap'd.....75¢78¢
 Door Por. Nickel.....\$2.00, 2.25¢
 Door Por. Plated, Nickel.....\$2.00, 2.25¢
 Drawer, Porcelain.....60¢10¢60¢10¢10¢
 Henricite Door Knob.....40¢10¢50¢
 Yale & Towne Wood, list Dec., 1885.....40¢
 Furniture Plain.....75¢gro inch, 10¢
 Furniture Wood Screws.....25¢10¢
 Base, Rubber Tip.....70¢10¢55¢
 Picture, Judd's.....60¢10¢10¢70¢
 Picture, Sargent's.....70¢10¢
 Picture, Hemacite.....35¢55¢
 Shutter, Porcelain.....65¢10¢
 Carriage, Jap.....\$gro 80¢, 60¢10¢

Ladies—

Melting, Sargent's.....55¢10¢
 Melting, Reading.....35¢10¢
 Melting, Monroe's Pat.....\$4.00, 49¢
 Melting, P. S. & W.....35¢10¢40¢
 Melting, Warner's.....30¢

Lawn Mowers—

Standard List.....50¢10¢
 Quaker City.....50¢10¢
 Enterprise.....60¢10¢

Lanterns—

Tubular—
 Plain with Guards, 2 doz.....\$4.00¢4.25¢
 Lift Wire, with Guards.....\$4.50¢4.75¢
 Square Plan, with Guards.....\$4.00¢4.25¢
 Sq. Lift Wire, with Guards.....\$4.25¢4.50¢
 Without Guards, 25¢ per doz less.

Miscellaneous.

Police, Small, \$6.00; Medium, \$7.25;
 Large, \$9.75.....\$20.25¢

Lemon Squeezers—

Porcelain Lined, No. 1.....\$6.00,
 25¢30¢
 Wood, No. 2.....\$3.00, 35¢
 Wood, Common.....\$1.70¢1.75¢
 Dunlap's Improved.....\$3.75, 20¢
 Sammls.....No. 1, \$5.00; No. 2, \$9; 12,
 \$18
 Jennings' Star.....\$2.50
 The Boss.....\$2.50
 Dean's, Nos. 1, 2 doz \$6.50; 2, \$3.35; 3,
 \$1.90
 Little Giant.....50¢50¢55¢
 King.....40¢55¢

Lines—

Cotton and Linen Fish, Draper's.....50¢
 Draper's Chalk.....60¢
 Draper's Mason's Lines, 84 ft., No. 1,
 \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4,
 \$2.75; No. 5, \$3.25.....25¢
 Cotton Chalk.....50¢
 Samson, Cotton, No. 4, \$2; No. 4 1/2, \$2.50;
 10¢
 Silver Lake, Braided, No. 0, \$6.00; No. 1,
 \$6.50; No. 2, \$7.00; No. 3, \$7.50
 gro.....25¢
 Mason's Lines, No. 3 1/2, \$1.50; No. 4,
 \$2.00; No. 4 1/2, \$2.50.....25¢
 Mason's Colored Cotton.....45¢
 Wire Clothes.....Nos. 18 19 20
 \$3.60 \$3.00 \$2.50

Ventilator Cord, Samson Braided,
 White or Drab Cotton, 2 doz \$7.50, 20¢

Locks, &c.—

Door Locks, Latches, &c.
 List Dec. 30, '88, chgd Feb. 2, '89.....

Mallory, Wheeler & Co., list July, '88.....50¢10¢60¢10¢

Sargent & Co., list Aug. 1, '88.....50¢10¢60¢10¢

Reading Hardware Co., list Feb. 2, '88.....10¢60¢10¢55¢

Note.—Lower net prices often made.

Perkins' Burglar Proof.....60¢25¢

Plate.....33¢25¢

F. Many's "Extension Cylinder" \$10.50
 per doz.

Barnes Mfg. Co.....40¢40¢10¢

Vale.....net prices

Deitz Flat Key.....30¢

Deitz, Nos. 36 to 39.....30¢10¢

Deitz, Nos. 51 to 63.....40¢10¢

Deitz, Nos. 80 to 96.....30¢

Stoddard Lock Co.....30¢33¢45¢

"Champion" Night Latches.....40¢

Barnes Mfg. Co.....40¢40¢10¢

Eagle and Corbin Trunk.....25¢45¢

"Champion" Cab. and Combin.....33¢45¢

Vale.....net prices

Romer's.....25¢

Seed's N. Y. Hasp Lock.....25¢

Cabinet—

Eagle, Gaylord Par. list March, '84, rev.
 ker and Corbin.....Jan. 1, '85, 33¢45¢

Deitz, Nos. 36 to 39.....30¢10¢

Deitz, Nos. 51 to 63.....40¢10¢

Deitz, Nos. 80 to 96.....30¢

Stoddard Lock Co.....30¢33¢45¢

"Champion" Night Latches.....40¢

Barnes Mfg. Co.....40¢40¢10¢

Eagle and Corbin Trunk.....25¢45¢

"Champion" Cab. and Combin.....33¢45¢

Vale.....net prices

Romer's.....25¢

Padlocks—

List Dec. 30, '84.....75¢75¢10¢

Vale Lock Mfg. Co.'s.....net prices

Eagle.....25¢25¢

Eureka, Eagle Lock Co.....40¢45¢

Romer's, Nos. 0 to 91.....30¢

Romer's Scandinavian, &c., Nos. 100 to
 505.....15¢

A. E. Deitz.....40¢

Champion Padlocks.....40¢

Hotchkiss.....45¢

Star.....45¢

Horsehoe.....\$ doz, \$8, 40¢40¢10¢

Barnes Mfg. Co.....40¢40¢10¢

Nock's.....30¢

Molasses Gates—

Stebbin's Pat.	70¢@70¢
Stebbin's Genuine	60¢@10¢
Stebbin's Tinned Ends	40¢@10¢
Chase's Hard Metal	50¢@10¢
Bush's	70¢@10¢
Lincoln's Pattern	20¢@10¢
Wood's	20¢@10¢
Boss, per doz.	60¢@10¢
Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.	60¢@10¢

Money Drawers—

per doz.	\$18.00
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Muzzles—

Safety	per doz.	\$3.00
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Nails, see Trade Report.

Wire Nails & Brads, list July 14, '87	70¢@10¢
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Wire Nails, Standard Penny	per keg	\$2.50
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Nail Puller—

Curtiss Hammer	per doz.	\$9.00
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Giant, No. 1	per doz.	\$30.00
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Pelican	per doz.	\$2.00
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Boss	per doz.	\$30.00
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Lightning	per doz.	\$21.00
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Nail Sets—

Square	per gr.	\$4.00
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Round	per gr.	\$3.25
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Cannon's Diamond Point	per gr.	\$12.00
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Nut Crackers—

Table (H. & B. Mfg. Co.)	per doz.	\$4.00
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Blake's Pattern	per doz.	\$2.00
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Turner & Seymour Mfg. Co.	per doz.	\$5.00
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Nuts—

Nuts, off list Jan. 1, 1888: Square, Hex.	5¢
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Hot Pressed	5¢
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Cold Punched	5¢
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In lots less than 100 lb.	per lb.	add 1/2¢
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boxes, add 1¢ to list.		
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Oakum—

Government	per 7½ lb.	\$8.00
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U. S. Navy	per 6½ lb.	\$7.00
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Navy	per 5½ lb.	\$6.00
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Oilers—

Zinc and Tin	per 65¢@5¢
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Brass and Copper	per 50¢@10¢
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Malleable, Hammers' Improved, No. 1.	per 3.00
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No. 2, 3, 4, 5, 6, 7, 8, 9, 10.	per 10¢@10¢
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Malleable, Hammers, Old Pattern, same	per 10¢@10¢
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list	per 40¢
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Prior's Pat. or "Paragon" Zinc	per 60¢@10¢
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Prior's Pat. or "Paragon" Brass	per 50¢
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Olmstead's Tin and Zinc	per 90¢
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Olmstead's Brass and Copper	per 90¢
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Broughton's Zinc	per 60¢
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Broughton's Brass	per 50¢
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Packing, Steam—

Standard	per 60¢@10¢
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Extra	per 60¢@10¢
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N. Y. B. & P. Co., Standard	per 50¢@10¢
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N. Y. B. & P. Co., Empire	per 70¢
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N. Y. B. & P. Co., Salamander	per 80¢
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Jenkins' Standard	per 65¢, 30¢
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Miscellaneous—

American Packing	per 10¢@11¢
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Russian Packing	per 14¢
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Italian Packing	per 13¢@14¢
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Cotton Packing	per 15¢@17¢
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Jute	per 7¢@8¢
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Padlocks—

See Locks.	
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Pails—**Galvanized Iron—**

Quarts	10 12 14
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Hill's Light Weight	per doz.	\$2.75
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Hill's Heavy Weight	per doz.	\$3.00
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Whitling's	per doz.	\$3.00
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Sidney Shepard & Co.	per doz.	\$3.00
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Iron Clad	per doz.	\$3.00
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Fire Buckets	per doz.	\$3.00
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Buckets, see Well Buckets.	
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Indurated Fibre Ware—

Star Pails, 12 qt.	per doz.	\$4.50
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Fire, Stable and Milk, 14 qt.	per doz.	\$5.85
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Pencils—

Faber's Carpenters'	per high list	50¢
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Dixon's Lead	per gro.	\$5.25
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Dixon's Lumber	per gro.	\$4.50
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Dixon's Carpenters'	per gro.	\$6.75
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Dixon's Carpenters'	per 40¢@10¢
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Picks—

Railroad or Adze Eye, 5 to 6, 12, 20;	per 6 to 7, \$13.00
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6 to 7, \$13.00	per 60¢@5¢
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Picture Nails—

Brain Head, Sargent's list	per 50¢@10¢
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Brain Head, Combination list	per 50¢@10¢
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Porcelain Head, Sargent's list	per 50¢@10¢
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Porcelain Head, Combination list	per 40¢@10¢
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Niles' Patent	per 40¢
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Pinking Irons—

per doz.	65¢
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Pipe, Wrought Iron—

List March 23, 1887.	
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1½ and under, Plain	per 55¢
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1½ and under, Galvanized	per 47½¢
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1½ and over, Plain	per 67½¢
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1½ and over, Galvanized	per 55¢
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Bolter Tubes, Iron	per 57½¢
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2 in. to 2½ in.	per 62½¢
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3 in. and larger	per 65¢
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Planes and Plane Irons—**Wood Planes—**

Molding	per 50¢@50¢
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Scotch, First Quality	per 60¢@60¢
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Scotch, Second Quality	per 60¢@10¢
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Bailey's (Stanley R. & L. Co.)	per 40¢@10¢
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Iron Planes—

Bailey's (Stanley R. & L. Co.)	per 40¢@10¢
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Miscellaneous Planes (Stanley R. & L. Co.)	per 20¢@10¢
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Victor Planes (Stanley R. & L. Co.)	per 30¢@10¢
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Steele's Iron Planes	per 35¢@35¢
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Meriden Mill Iron Co.	per 30¢@10¢
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Davis' Iron Planes	per 30¢@10¢
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Birmingham Plane Co.	per 50¢@50¢
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Cage Tool Co.'s Self-Setting	per 30¢@10¢
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Chaplin's Iron Planes	per 40¢@40¢
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Sargent's	per 30¢@10¢
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Plane Irons—

Plane Irons	per 20¢@10¢
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Plane Irons, Butcher's	per \$5.00@5.25
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Plane Irons, Buck Bros.	per 30¢
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Plane Irons, Auburn Tool Co., "This"	per 40¢
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Plane Irons, Auburn Tool Co., "This"	per 40¢
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Sandusky Tool Co.	per 30¢
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Single and Cut	per 30¢
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Double	per 40¢
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L. & J. J. White	per 25¢
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Pliers and Nippers—

Button's Patent	per 30¢@10¢
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Hall's No. 2, 5 in.	per \$13.50
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Hall's No. 2, 5 in.	per \$13.50
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Humason & Beckley Mfg. Co.	per 50¢@50¢
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Gas Pliers	per 60¢
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Gas Pliers, Custer's Nickel Plated	per 60¢@5¢
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Eureka Pliers and Nippers	per 40¢
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Russell's Parallel	per 25¢
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P. S. & W. Cast Steel	per 50¢
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P. S. & W. Tinner's Cutting Nippers	per 50¢
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Carew's Pat. Wire Cutters	per 20¢
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Morrill's Parallel	per doz.	\$12.00
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Cronk's 8 in.	per \$15.00
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10 in.	per \$21.00
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40¢@40¢	
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Plumbs and Levels—

Regular List	per 70¢@10¢
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Diston's	per 45¢@10¢
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Diston's	per 70¢@10¢
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Davis' Iron Levels	per 30¢
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Davis' Inclinometers	per 10¢@10¢
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Polish, Metal.

Prestoline	per 20¢@10¢
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Krestoline Paste	per 33¢@33¢
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Gaston's Silver Compound	per 33¢@33¢
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Pokes, Animal—

Bishop's L. X. L.	per doz.	\$6.50
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Bishop's J. K. L.	per doz.	\$5.00
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Bishop's Pioneers	per doz.	\$3.75
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Bishop's American	per doz.	\$3.00
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Poppers, Corn—

Round or Square, 1 qt.	per gr.	\$12.00
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Round or Square, 2 qt.	per gr.	\$25.00
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Post Hole and Tree Augers and Diggers—

Samson Post Hole Digger	per doz.	\$36.00
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25¢@10¢	
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Fletcher Post Hole Augers	per doz.	\$30.00
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Eureka Diggers	per doz.	\$10.00
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Lead's	per doz.	\$8.00
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Vaughan's Post Hole Auger	per doz.	\$13.00
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\$14.00	
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Kohler's Little Giant	per doz.	\$18.00
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Kohler's Hercules	per doz.	\$15.00
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Kohler's New Champion	per doz.	\$9.00
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Schneider	per doz.	\$18.00
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Ryan's Post Hole Diggers	per doz.	\$24.00
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Cronk's Post Bars	per doz.	\$20.00
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50¢@50¢	
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Gibbs Post Hole Digger	per doz.	\$30.00
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Imperial	per doz.	\$15.00
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Potato Rakes—

White Mountain	per doz.	\$5.00
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Antrim Combination	per doz.	\$8.00
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Hoosier	per doz.	\$13.50
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Pruning Hooks and Shears—

Diston's Combined Pruning Hook and	per doz.	\$18.00
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Saw	per doz.	\$18.00
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Diston's Pruning Hook	per doz.	\$12.00
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20¢@10¢	
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E. S. Lee & Co.'s Pruning Tools	per 40¢
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Pruning Shears, Henry's Pat.	per doz.	\$3.75
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Machine.....	55c	Soldering Irons—	Common and Patent Brads, 70s10c70s10c	Parker's.....	20c
Flat Head, Iron.....	50c	Covert's Adjustable, list Jan. 1, 1886.	35c2c	Hungarian Nails.....	70s10c70s10c
Round Head, Iron.....	50c			Chair Nails.....	70s10c70s10c
				Zinc Glaziers' Points.....	50c50c50c
Bench and Hand—		Spoke Shaves—		Cigar Box Nails.....	50c10c50c10c50c
Bench, Iron.....	50c10c50c10c50c	Iron.....	45c	Picture-Frame Points.....	50c10c50c10c50c
Bench, Wood, Beech.....	50c10c50c10c50c	Wood.....	30c	Looking Glass Points.....	50c10c50c10c50c
Bench, Wood, Hickory.....	25c10c25c10c25c	30c		Leathered Carpet.....	50c10c50c10c50c
Bend, Wood.....	25c10c25c10c25c	Barley's (Stanley R. & L. Co.).....	40c10c	Brush Tacks.....	50c10c50c10c50c
Lag, Blunt Point.....	75c75c10c	Stearns'.....	20c10c30c	Shoe Finders', List Jan. 2, 1888, 10c10c	
Coach and Lag, Gimlet Point.....	75c				
Bed.....	25c5c	Spoke Trimmers—		Lining and Saddle Nails, List Jan. 1, 1888.....	10c10c10c
Hand Rail, Sargent's.....	60c10c	Bonney's.....	50c	Silvered.....	30c10c10c
Hand Rail, H. & B. Mfg. Co.....	70c10c	Stearns'.....	20c	Japanned.....	20c10c10c
Hand Rail, Am. Screw Co.....	75c	Ives', No. 1, \$15.00; No. 2, \$12.00.....	50c10c	Double-Pointed Tacks.....	85c
Jack Screws, Millers Falls list.....	60c50c50c	Douglas'.....	50c10c	Wire Carpet Nails.....	50c10c
Jack Screws, P. S. & W.....	60c50c50c			Wire Brads & Nails, See Nails, Wire	
Jack Screws, Sargent's.....	60c10c60c10c50c	Spoons and Forks—		Steel Wire Brads, R. & E. Mfg. Co.'s	50c10c
Jack Screws, Stearns'.....	40c40c10c	Tinned Iron—		List.....	50c10c
		Basting, Cen. Stamp. Co.'s list.....	70c10c		
Scroll Saws—		Solid Table and Tea, Cen. Stamp. Co.'s	70c10c	Tap Borers—	
Lester, complete, \$4.00.....	25c	list.....	70c10c	Common and Rind.....	20c10c
Rogers, complete, \$1.00.....	25c	Buffalo S. S. & Co.....	33c2c	Iv's Tap Borers.....	35c10c
Barnes' Builders' and Cabinet Makers'.....	15c	Silver-Plated—(4 mos. or 5c cash 30c)		Enterprise Mfg. Co.....	20c10c
Barnes' Scroll Saw Blades.....	35c	Meriden Bros.....	50c	Clark's.....	33c10c35c
		C. Rogers & Bros.....	50c		
Scythe Snaths.....	50c2c	Rogers & Bro.....	50c	Tapes, Measuring—	
Shears—		Reed & Barton.....	50c	American.....	25c10c
American (Cast) Iron.....	75c10c75c10c50c	Wm. Rogers Mfg. Co.....	50c10c00c	Spring.....	40c
Pruning.....	See Pruning Hooks and Shears	Simpson, Hall, Miller & Co.....	50c10c	Chesterman's, Regular list.....	25c30c
Barnard's Lamp Trimmers.....	50c2c	Holmes & Edwards Silver Co.....	50c10c		
Tinsmiths.....	20c2c	No. 67 Mexican Silver.....	50c10c	Thermometers—	
Seymour's, List, Dec. 1881.....	60c10c10c60c10c10c50c	No. 30 Silver Metal.....	50c10c	Tin Case.....	80c80c10c
Heinrich's, List, Dec. 1881.....	60c10c10c60c10c10c50c	No. 24 Nickel German Silver.....	50c10c	Thimble Skeins—See Skeins.	
Heinrich's Tailor's Shears.....	33c3c	No. 50 Nickel Silver.....	50c10c	Ties, Bale—Steel	
First quality C. S. Trimmers.....	80c10c80c10c50c	No. 49 Nickel Silver.....	50c10c	Standard Wire, list.....	50c10c10c50c
Second quality C. S. Trimmers.....	80c10c80c10c10c50c	German Silver.....	50c50c50c		
		German Silver, Hall & Elton.....	50c50c	Tinners' Shears, &c.—	
Acme Cast Shears.....	10c10c	Nickel Silver.....	50c50c50c	Shears and Snips (P. S. & W.).....	20c25c
Diamond Cast Shears.....	10c	Britannia.....	60c	Punches and snips.....	20c25c
Clippers.....	10c10c	Boardman's Britannia Spoons, case	60c	Snips, J. Mallinson & Co.....	33c3c
Victor Cast Shears.....	10c10c	lots.....	60c		
Hare Bros. & Hulbert, Solid Forged	40c			Tinware—	
Steel.....	40c	Springs—		Stamped, Japanned and Pinned, list	75c75c5c
Chicago Drop Forge & F. Co., Solid	60c	Elliptic, Concord, Platform and Half	60c60c5c		
Steel.....	60c	Scroll.....	60c60c5c	Tire Benders, Upsetters, &c.—	
Steel Forged.....	60c	Cliff's Bolster Springs.....	25c	Stoddard's Lightning Tire Upsetters.....	15c
Clauss Shear Co., Japanned.....	70c	Squares—		Detroit Perfect Tire Bender.....	15c
Clauss Shear Co., Nickeled, same list.....	60c	Steel and Iron.....	75c10c80c	Tobacco Cutters—	
		Nickel-Plated.....	75c10c80c	Champion.....	20c10c30c
Sheaves—		Try Square and T Bevels.....	60c10c60c10c	Wood Bottom.....	50c10c6c25c
Sliding Door—		Disston's Try Square and T Bevels.....	45c10c	All Iron.....	50c45c
M. W. Co., list July, 1888.....	60c10c60c5c	Waterbottom's Try and Miter.....	30c10c	Nashua Lock Co.'s 50c50c55c	
R. & E., list Dec. 18, 1885.....	55c20c	Starrett's Micrometer Caliper Square.....	25c	Wilson's.....	55c
Corbin's list.....	60c10c10c	Avery's Flush Bevel Squares.....	30c5c	Sargent's.....	55c
Patent Roller.....	60c10c10c			Acme.....	50c20c, 40c
Patent Bolster, Hatfield's.....	75c	Staples—			
Russell's Anti-Friction, list Dec. 18, 1885.....	60c2c	Fence Staples, Galvanized.....	Same price	Transom Lifters—	
Moore's Anti-Friction.....	50c	Fence Staples, Plain.....	See		

CURRENT METAL PRICES.

APRIL 17, 1889.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
3/4 to 2 in. round and square...	per lb 1.90 @ ..
1 to 6 in. x 3/4 to 1 in.	per lb 2.00 @ 2.10
Refined Iron:	
3/4 to 2 in. round and square...	per lb 2.00 @ 2.10
1 to 4 in. x 3/4 to 1 1/2 in.	per lb 2.20 @ 2.30
4 1/2 to 6 in. x 3/4 to 1 in.	per lb 2.20 @ 2.30
1 to 6 in. x 1 1/2 and 5-16	per lb 2.20 @ 2.30
Rods—5/8 and 1 1/2 round and sq.	per lb 2.20 @ 2.30
Bands—1 to 6 x 3-16 to No. 12	per lb 2.20 @ 2.30
"Burden Best" Iron, base price.	per lb 3.00 @ ..
Burden's "H. B. & S." Iron, base price.	per lb 2.80 @ ..
"Ulster"	per lb 3.10 @ ..
Norway Rods	per lb 4.00 @ 5.00

Merchant Steel from Store.

Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots.	2 1/2
Best Cast Steel, base price in small lots	8 1/2
Best Cast Steel Machinery, base price in small lots	5

Sheet Iron from Store.

Common American.	R. G. Cleaned.
10 to 16	per lb 2.75 @ 2.80
17 to 20	per lb 2.85 @ 3.00
21 to 24	per lb 3.00 @ 3.10
25 and 26	per lb 3.20 @ ..
27	per lb 3.35 @ 3.37 1/2
28	per lb 3.50 @ ..
B. R.	2d qual.
Galv'd, 14 to 20, per lb. 4.50 @ ..	4.38 @ ..
Galv'd, 11 to 24, per lb. 4.87 1/2 @ ..	4.75 @ ..
Galv'd, 25 to 26, per lb. 5.25 @ ..	5.12 @ ..
Galv'd, 27	per lb 5.02 1/2 @ ..
Galv'd, 28	per lb 5.00 @ ..
Patent Planchet	per lb A 10 1/2 B, 9 1/2
Russia	per lb 9 1/2 @ 10 1/2
American Cold Rolled B. B.	per lb 5 1/2 @ 7 1/2

English Steel from Store.

Best Cast	per lb 15
Extra Cast	per lb 16 1/2
Swaged, Cast	per lb 16
Best Double Shear	per lb 15
Blister, 1st quality	per lb 12
German Steel, Best	per lb 10
2d quality	per lb 9
3d quality	per lb 8
Sheet Cast Steel, 1st quality	per lb 15
2d quality	per lb 14
3d quality	per lb 12 1/2

METALS.

Banca, Pigs	per lb 23
Straits, Pigs	per lb 22 3/4
English, Pigs	per lb 23 1/4
Straits in Bars	per lb 24

Tin Plates.

Charcoal Plates.—Bright.	Per box.
Melny Grade	per box \$5.75 @ \$6.00
"	per box 6.25 @ 6.50
"	per box 6.00 @ 6.25
"	per box 7.25 @ 7.50
"	per box 7.50 @ 7.75
"	per box 7.50 @ 7.75
"	per box 15.00 @ 15.50
"	per box 5.50 @ 5.75
"	per box 7.25 @ 7.50
"	per box 6.00 @ 6.25
"	per box 6.00 @ 6.25
"	per box 7.50 @ 7.75
"	per box 7.50 @ 7.75
"	per box 7.50 @ 7.75
"	per box 5.00 @ 5.12 1/2
"	per box 5.25 @ 5.50
"	per box 11.00 @ ..
"	per box 6.00 @ ..
"	per box 6.25 @ ..
"	per box 6.00 @ ..
"	per box 12.00 @ ..
"	per box 4.75 @ 5.00
"	per box 5.75 @ 6.00
Coke Plates.—Bright.	
Steel Coke.—IC, 10 x 14, 14 x 20.	per box \$4.75 @ \$5.00
"	per box 7.25 @ 7.50
"	per box 9.75 @ 10.25
"	per box 5.50 @ 5.75
BV Grade.—IC, 10 x 14, 14 x 20.	per box 4.40 @ 4.60
Charcoal Plates.—Terne.	
Dean Grade.—IC, 14 x 20.	per box \$4.40 @ \$4.62 1/2
"	per box 9.00 @ 9.25
"	per box 4.40 @ 4.62 1/2
"	per box 11.00 @ 11.37 1/2
Abecarne Grade.—IC, 14 x 20.	per box 4.25 @ 4.50
"	per box 8.50 @ 9.00
"	per box 5.25 @ 5.50
"	per box 10.50 @ 10.80

Tin Boiler Plates.

IXX, 14 x 26	112 sheets.	\$12.50 @ \$12.75
IXX, 14 x 28	112 sheets.	12.75 @ ..
IXX, 14 x 31	112 sheets.	14.25 @ ..

Copper.

Duty: Pig, Bar and Ingots, 4¢; Old Copper, 3¢	
per lb. Manufactured (including all articles of which Copper is a component of chief value), 45 s. ad valorem.	

Ingots.

Lake	per lb 16 1/2 @ 17
"Anchor" Brand	per lb 16

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30—72	25	25	25	25	25	25	25	25	25	25
30—72	25	25	25	25	25	25	25	25	25	25
36—96	25	25	25	25	25	25	25	25	25	25
36—96	25	25	25	25	25	25	25	25	25	25
48—96	25	25	25	25	25	25	25	25	25	25
48—96	25	25	25	25	25	25	25	25	25	25
60—96	25	25	25	25	25	25	25	25	25	25
60—96	25	25	25	25	25	25	25	25	25	25
84—96	25	25	25	25	25	25	25	25	25	25
84—96	25	25	25	25	25	25	25	25	25	25
Over 84 in. wide	28	30	30	30	30	30	30	30	30	30

All Bath Tub Sheets. 16 oz. 14 oz. 12 oz. 10 oz.

Per pound. \$0.53 0.30 0.32 0.35

Bolt Copper, 3/4 inch diameter and over, per pound. 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

14 ounce to square foot and heavier. 28¢

12 ounce and up to 14 ounce to square foot. 29¢

10 ounce and up to 12 ounce. 31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning sheets on one side, 10, 12 and 14 x 48 each. 8¢

Tinning sheets on one side, 30 x 60 each. 30¢

For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each. 12¢

For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each. 12¢

For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.), each. 12¢

Tinning sheets on one side, other sizes, per square foot. 2 1/2¢

For tinning both sides double the above prices.

Planchet Copper.

Planchet Copper List May 5, 1888. Net

Seamless Brass and Copper Tubes.

O. G.	N. G.	3/4	1/2	3/8	1/4	1/8	1/16
8-14	6-12	38	34	31	30	29	28
15	13	39	34	32	31	30	29
16	14	40	35	33	32	31	30
17	15	41	36	34	33	32	31
18	16	43	37	35	34	33	32
19	17	44	38	36	35	34	33
20	18-19	45	40	38	37	36	35
21	20	47	42	40	39	38	37
22	21	49	43	41	40	39	38
23	22	51	45	43	42	41	40
24	23	54	47	45	44	43	42
25	24	57	50	47	46	45	44

Copper, Bronze and Gilding Tube, 3¢ per lb additional.

Brazed Brass Tubing. (To No. 20, inclusive.)

Above 5-16 inch to 3 inch, inclusive. 35¢

Plain, above 3 inch. 45¢

Plain, 5-16 inch. 45¢

Plain, 1/4 inch. 60¢

Plain, 3-16 inch. 1.00

Plain, 1/2 inch. 1.80

Fancy Tubing, Brass, to No. 20, inclusive. 43¢ per lb

Brass Tubing, 3¢ per lb more than Brass.

Discount from list. 20%

Roll and Sheet Brass.

Discount from list. 10 @ 15%

High Brass Rods.

Over 1 inch diameter. 27¢

1/2 inch to 1 inch diameter, both inclusive. 24¢

No. 8 and less than 1/4 inch diameter. 26¢

Smaller than No. 8. 30¢

Hexagon, Octagon and Square, 2¢ per lb advance over Round Rods.

Spelter.

Duty: Pig, Bars and Plates, \$1.50 per 100 lb.

Western Spelter

"Bergenport"

"Bertha"

Zinc.

Duty: Sheet, 3 1/4¢ per lb.

600 lb casks

Per lb

Lead.

Duty: Pig, \$2 per 100 lb. Old Lead, 2¢ per lb. Pipe and Sheets, 3¢ per lb.

American	41¢
Newark	41¢
Bar	41¢
Pipe, subject to trade discount.	6¢
Tin-Lined Pipe, subject to trade discount.	15¢
Block Tin Pipes, subject to trade discount.	45¢
Sheet, subject to trade discount.	6 1/2¢

Solder.

1/2 @ 1/4 (Guaranteed). 15¢
Extra Wiping

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson

Hallett's

Fittings.

Cast Iron Fittings, Black and Galvanized, Standard sizes.	70¢10
Cast Iron Fittings, Bushings and Plugs.	75¢10
Cast Iron Fittings, Flanges.	70¢10
Malleable Iron Bushings.	75¢10
Malleable Iron Unions.	67 1/2¢
Malleable Iron American Unions.	70¢10
Wrought-Iron Nipples.	70¢
Wrought-Iron Couplings.	70¢
Wrought-Iron Long Screws.	70¢
Casing Fittings.	60¢
Malleable Iron Fittings.	25¢

Valves, Cocks, &c.

Iron Body Valves.	70¢
Throttle Valves, Iron Body.	70¢
All-Iron Valves.	65¢
Compression Gauge Cocks.	60¢
Mississippi Gauge Cocks.	60¢
Register Gauge Cocks.	65¢
Air Cocks and Radiator Air Cocks.	65¢
Steam Gauge Cocks.	60¢
Oil Cups, Plain, Elbow, new pattern, T and Lever Handle.	65¢
Globe Oil Cups.	55¢
Common Lubricators.	65¢
Lubricators with Air Cocks.	65¢
Iron Body Lubricators.	65¢
Steam Whistles.	65¢
Whistle Valves.	65¢
Water Gauges.	65¢
Brass Expansion Joints.	55¢
Pump Valves.	55¢
Soldering Unions.	55¢
Soldering Nipples.	70¢
Brass Unions (Union Joints).	65¢
Radiator Nipples.	60¢
Fusible Plugs.	60¢
Oil Pumps.	65¢
Self-Acting Air Valves.	55¢
Vacuum Valves.	55¢
Steam Swing Joints.	55¢
Iron Strainers.	55¢10
Jenkins' Iron Body Valves, except Gate Valves.	60¢10
Jenkins' All-Iron Valves, except Gate Valves.	60¢
Jenkins' Iron Body Gate Valves.	55¢
Jenkins' All-Iron Gate Valves.	55¢
Iron Cocks, all iron.	65¢
Iron Cocks, with Brass Plugs.	65¢
Brass Globe, Angle and Cross Valves.	65¢
Brass Globe Valves, Finished.	65¢
Brass Globe and Angle Valves, hose outlet.	65¢
Brass Garden Hose Valves.	65¢
Brass Caps for Hose Valves.	60¢
Brass Horizontal, Vertical and Angle Check Valves.	65¢
Brass Safety Valves.	65¢
Brass Safety Valves, low pressure.	65¢
Brass Safety Valves, low pressure, with balance weight.	65¢
Brass Butterfly Valves.	65¢
Brass Throttle Valves.	65¢
Brass Radiator Valves.	65¢
Brass Radiator Valves, Jenkins'.	65¢
Brass Jenkins' Globe, Angle, Cross, Corner, Safety and Check Valves.	65¢
Brass Jenkins' Gate Valves.	50¢
Brass Steam Cocks.	60¢
Brass Gas, Meter and Union Meter Cocks.	60¢
Brass Fittings, Rough.	60¢
Brass Fittings, Finished.	60¢
Brass Bushings.	60¢

Plumbers' Brass Work.

Ground Key Work, Rough.	60¢
Ground Key Work, Finished.	55¢
Compression Work.	60¢
Compression Work, Grundy. Heavy Pattern.	55¢
Chain Stays.	60¢
Iron Boiler Couplings, Ground Face, per set \$1.	net
Basin Plugs.	60¢
Sink or Bath and Wash Tray Plugs.	60¢
Basin Clamps.	55¢

Paints.

Black, Lamp—Coach Painters'.	per lb 22 @ 24
"	Ordinary
Black, Ivory Drop, fair.	12 @ 15
"	best.
Black Paint, in oil.	kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best.	40 @ 55
"	in oil.
"	Chinese dry
"	Ultramarine
Brown, Spanish.	18 @ 30
"	Van Dyke
Dryers, Patent American.	ass'd cans, 9¢; kegs, 7¢
Green, Chrome	15 @ 23
Green, Chrome in oil.	14 @ 18 @ 25
Green, Paris.	